

The OBSERVER



The Newsletter of the Twin City Amateur Astronomers, Inc.

February 2001 Volume 26, Number 2

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How To Find Deep-Sky Objects Rapidly

—Jay Renolds Freeman (© 2001)

In anticipation of hordes of TCAAers desiring to use the C-14 as the weather turns clement, we present this article by Jay Renolds Freeman -- a longer article than we usually run, but manifestly well worth the column inches. It is reproduced with Jay's kind permission, but is copyright Jay Renolds Freeman, 2001.

Sometimes I look at 200 deep-sky objects a night, and people ask how I log so many so fast. In part, I rarely look at one

object for long: I generally view things near the chart limit of *Millennium Star Atlas*, and with only the fourteen-inch aperture of Harvey, my Celestron 14, there is little detail in most. With more

aperture or brighter targets, I would be more leisurely.

Yet time spent hunting objects is time *not* spent observing them. So perhaps advice on how to find things rapidly will be useful even to folks who take longer looks.

I locate objects by star-hopping. If you
continued on page 4



You, too, can find M 80 (and all the other Messiers), with a little help from Jay!

Public Meeting March 15th @ the BPL: Heaven and Earth and Shakespeare

TCAA Calendar

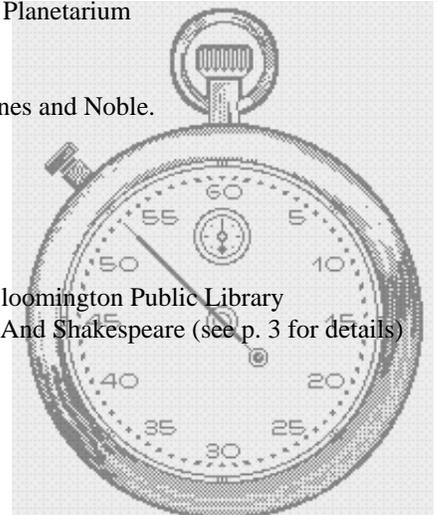
Saturday, 3 March, 2001, 7:30 PM PM, ISU Planetarium
The Stars Tonight (see p. 3 for details)

Monday, 5 March, 2001, 7:30-9:00 PM, Barnes and Noble.
TCAA Reading Group (see p. 2 for details)

Saturday, 10 March, 2001, Dusk, SGO
C-14 Training Session

Thursday, 15 March, 2001, 7:00-8:00 PM, Bloomington Public Library
TCAA Meeting. Topic: Heaven And Earth And Shakespeare (see p. 3 for details)

13-15 July, 2001, St. Paul, MN
Universe 2001 Expo (see p. 5 for details)



The Observer

The Newsletter of the TCAA, Inc.

The Observer is a monthly publication of the Twin City Amateur Astronomers, Inc., a non-profit organization of amateur astronomers interested in studying astronomy and sharing their hobby with the public.

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Dues

\$25.00 per household, per year
\$15.00 for members over 60
\$12.00 for newsletter only
\$ 1.25 for a single newsletter copy

Etcetera, etcetera, etcetera

— Michael P. Rogers

Last week's Annual Banquet was, in spite of the unseasonably cold conditions, a rousing success. Over 35 people were present, and all seemed to have a good time. Jim Brown gave an excellent talk about opportunities for amateur astronomers. He also just happened to have a CCD camera with him, and although the C-14 isn't quite aligned, managed to take several images of Jupiter before the cold drove us back to the nature center. Dan Miller was master of ceremonies for the event, and Jean Memken was responsible for the main course, table arrangements, banquet program, not to mention three rambunctious children(!). Thanks to Dan and Jean and to everybody else who helped out, for making the event come off so smoothly.

There was, of course, a Board of Directors election during the banquet. The new members, who will assume their official positions during their first meeting, are (in alphabetical order):

Jim Baker
Brian Barling
Sandy McNamara
Dan Miller
Duane Yockey

I think these people deserve a warm round of applause for their willingness to help out the club!

New Meeting Times?

A few people have discussed the idea of resuming monthly meetings at the ISU Planetarium. Tom Willmitch has indicated that he would be glad to have us meet at the planetarium, and there is no doubt that it has a certain ambiance. By separating club meetings from public presentations at the BPL (and other locations), we would give ourselves an opportunity to get more "techy" without having to worry about isolating our audience. It's up to the new board to make these decisions, but they are surely willing to listen to

your opinions, for this is *your* club. What date/time would work best for you? You can always join the mailing list to discuss these ideas. Just send blank e-mail to TCAA-subscribe@yahoo.com to join the list. (It's been fairly moribund lately, so don't worry about your e-mail box being inundated!). All the board members are on the list, and would surely appreciate the feedback.

TCAA Reading Group

The TCAA Reading Group's next meeting is going to be March 5th, at 7:30 PM, at the Barnes and Noble Cafe. Our main order of business will be to select a new book. The February turnout was pretty low, and it may be time to reconsider meeting times for this group, too -- send e-mail to the mail list, so we can keep this discussion public.

C-14 Training Sessions

As mentioned during the banquet, now that the observatory is essentially open for business, we need to start offering training sessions. I will be out at the SGO on March 10th, at dusk, if the weather is good. Subsequent "official" sessions will be scheduled once the board has set the agenda for the year. In the meantime, if you can't wait for the 10th, contact either Sandy, Dan or myself, to schedule an earlier session.

Skyline!

The Official Voice of the ISU
Planetarium/TCAA

438-5007

Under the Dome

— Tom Willmitch

The Illinois State University Planetarium will present **The Stars Tonight** at 7:30 PM on Saturday, March 3, 2001.

Explore the beauty of the night sky during this live planetarium presentation. The Stars Tonight is your chance to explore March's bright stars and constellations. Under the planetarium dome you will also locate the bright planets found overhead shortly after dark. The Stars Tonight is fun for the entire family.

Admission to The Stars Tonight is \$2 for adults, \$1.50 for children ages 5-12, and \$1 for children ages 3-4. Friends of the Planetarium are admitted free of charge.

The ISU Planetarium is located under the white domed roof at the east end of Felmley Hall of Science. Felmley Hall is located on the northeast corner of the ISU campus at the intersection of School Street and College Avenue.

Free parking is available a short distance from the ISU Planetarium in University parking lot F-67, located on the east side of School Street. For more information, please call (309) 438-8756.

Bad Astronomy

I don't know how many of you saw last Thursday night's Moon Conspiracy "documentary" on Fox Television. However,



you should be aware of the program, as you may be asked about it by visitors to the Planetarium.

Here is a good Internet link to information refuting this recent documentary from the lunatic fringe:

<http://www.badastronomy.com/bad/tv/foxapollo.html>

Heaven and Earth and Shakespeare: A BPL Presentation

—Michael P. Rogers

William Shakespeare lived and worked at a time of great foment in astronomy. Copernicus's work was published a mere two decades before Shakespeare's birth. Famed Danish astronomer Tycho Brahe was at the peak of his powers while Shakespeare was writing his early plays. And several fortuitously timed supernovae, comets and eclipses conspired to keep the cosmos very much in Shakespeare's thoughts.

And, as you might imagine in the case of the most studied playwright of all time, scholars have attempted to quantify this interest in astronomy. A review of his plays reveals the following statistics:

Object	# of Times Referenced
Stars	135
Planets	19
Eclipses	11
Comets	7
Heavens	800

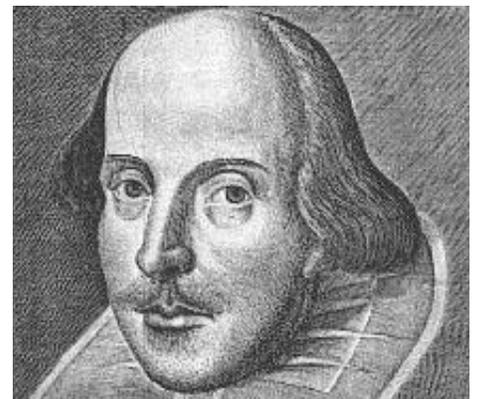
Many of the lines below are so popular that even those with only a passing interest in Shakespeare are likely to be familiar with them. Consider just two (and test yourself, to see if you can identify the play and character):

*There are more things in heaven and earth, Horatio,
Than are dreamt of in your philosophy*

*But I am constant as the northern star
Of whose true fix'd and resting quality
There is no fellow in the firmament.*

But *was* Shakespeare much of an astronomer? What were the skies like in his time? What particular supernovae, eclipses, and comets did he see, and how did they affect his outlook? And how much did he get *wrong*?

The answer to these and other burning (or should that be fusing?) questions will be revealed, hopefully, at our next meeting.



So, join the merry throng at what will temporarily become the Globe Theatre, that is, the Bloomington Public Library, on Thursday, March 15th, from 7 - 8 PM. Food and drink will be provided, and if we're lucky, perhaps a ghost or two will also stroll in :-)

Quotation Identification:
The first is from Hamlet, who also speaks the
lines.
The second is from Julius Caesar, and again
the protagonist is the one who speaks.

Loaner Telescope User Manuals

— Sandy McNamara

As those of you who attended the banquet know, the revised/updated new member information packets are done as are the information sheets for all of the new and revised observing programs. To all new members (well, probably anyone who has joined in the last year), if you would like one of these informative folders — just ask. These are too bulky for routine mailing but a supply will be kept at the SGO observatory and some will be in the possession shortly of each member of the new Board of Directors. So they will be available if you are in attendance at almost any TCAA sponsored activity.

My NEXT project is going to be developing user manuals for the TCAA loaner telescopes. When you pick up one of the TCAA telescopes, you are given a brief hands-on lesson on how to assemble and use it but I thought it would be nice to have a booklet to take home with it. With the exception of the equatorially mounted Celestron Refractor (which has its own

manual I can go from), all of the telescopes are dobsonian (alt/az) mounted reflectors.

My question to you all is what would you like to see in this “user manual”? If you have purchased a reflecting telescope, perhaps you could send me the basic contents of your manual — and tell me what is missing from it that you would like to have seen. Keep in mind that this is not designed to be a complete owner’s instruction for care & upkeep, cleaning, or collimation but just something that will help beginners make use of the telescope they have borrowed. A discussion of how to determine eyepiece magnifications, field of view, and celestial directions is in the new member packet and won’t be included (unless you think the duplication would be helpful).

Some thoughts:

- 1) A brief general discussion of Newtonian telescope optics & design
- 2) How to operate and align the Telrad

finder scope

- 3) How to align the magnifying finder scope (for those that have one)
- 4) How to determine if the telescope is in need of collimation (NOTE: we are planning several “collimation school” sessions for this spring/summer, probably prior to the MOOS or possibly at a TCAA member meeting)

5) A section with perhaps a couple dozen beginner/showcase deep sky objects to look for which would include a brief description of the object along with Telrad finder chart, finderscope/binocular view, eyepiece view chart. 7) ???

Also, although the TCAA has an extensive library of reference books, would it be helpful to have a beginner’s star atlas (Tirion’s Bright Star Atlas or Edmunds Mag 6 Star Atlas spring to mind as good ones) to accompany each telescope? They would have to be reasonable enough in price to purchase multiple quantities of on our limited budget. Suggestions?

Banquet Snapshot

— Michael P. Rogers

During the social hour, some guests mingled in the nature center; a fair number had already made their way to the SGO, and were enjoying a fabulous view of Venus in 3/4 (?) phase.

Although not quite as well attended as last year’s banquet — to be expected, considering its slightly less accessible location, and less well-known speaker — a random sample of the 35 or so in attendance indicated that everybody had a fine time.

Our keynote speaker, Dr. Jim Brown, spoke expertly, entertainingly and enthusiastically about how amateur astronomers can assist professionals, then helped inaugurate the C-14 by taking some CCD images (to appear next issue).



Universe 2001

— ASP

The heavens are coming to Earth in St. Paul, Minnesota, on July 13-15, and everyone is invited. Indeed, this is an astronomy event you cannot afford to miss!

For over 100 years, the Astronomical Society of the Pacific (ASP), the nation's oldest and the world's largest general astronomy society, has worked to explain the mysteries of the Universe to students, teachers, hobbyists and the general public. Its Annual Meetings bring together professional and amateur astronomers, astronomy historians and educators, science students and the general public.

You and all members of your organization are encouraged to attend the weekend UNIVERSE 2001 Expo, a part of the ASP's 113th Annual Meeting.

The activities begin on the evening of Friday, July 13, with a star party hosted by the Minnesota Astronomical Society and the ASP. Following that evening of observing, the weekend of July 14-15 is filled with speakers and numerous exhibits for all ages. Among the confirmed speakers are David H. Levy, noted amateur astronomer, comet discoverer; Claude Nicollier, Shuttle astronaut and astronomer; Virginia Trimble, astronomer from the Universities of Maryland and California, Irvine; Bob Berman, astronomy columnist for "Discover" and "Astronomy" magazines; Alex Filip-

penko, astronomer from the University of California, Berkeley and William Sheehan, well-known amateur astronomer and author.

In addition to speakers addressing topics like "The Greatest Sky-Spectacles of the 21st Century," "Einstein's Biggest Blunder? The Case for Cosmic "Antigravity," and "The 10 Great Tourist Wonders of the Solar System," the weekend Expo will include a large exhibit hall of astronomy-related merchandise and displays—including books and photography supplies, telescopes and computer software, and booths for on-going and future NASA missions. There will also be book signings and drawings for astronomy-related prizes. Join people from around North America in a national astronomy festival where a weekend pass is only \$20.

All weekend activities will take place at the Radisson Riverfront Hotel, 11 E. Kellogg Blvd., St. Paul, MN 55101, 651-292-1900, from 9:00a.m.-5:30 p.m., with the exception of Friday evening's star party. For information, including fees, visit <http://www.aspsky.org/meetings.html>.

Meeting cosponsors include Astronomy Magazine and Astronomy.com, the Chandra X-Ray Observatory Center, the University of Minnesota's Department of Astronomy, the Science Museum of Minnesota, and the Minnesota Astronomical Society.

Make a date with

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on

WGLT, 89.1 FM

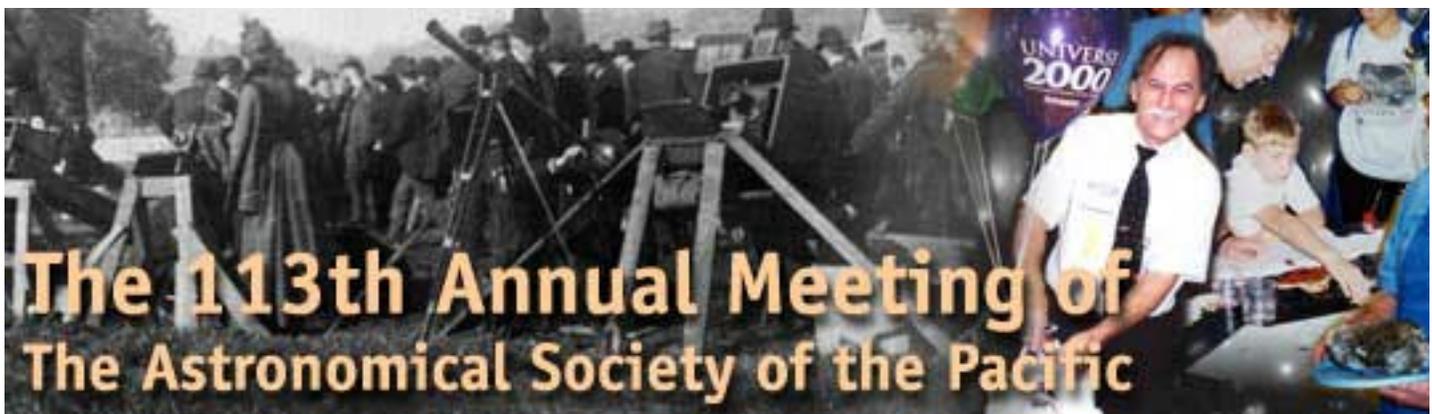
Weekdays @ 6:58AM & 6:58PM

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use setting circles — analog or digital — or have a computer-controlled telescope, this article won't help. I do not object to such devices, they just aren't part of my hobby at present.

Five areas contribute to finding things quickly. These are (1) having the right equipment, (2) having “deep” charts, (3) knowing how to use equipment and charts properly for finding things, (4) planning and observing systematically, and (5) creature comforts.

THE RIGHT EQUIPMENT:

For me, the right equipment means a telescope which is

Solidly mounted,

With the eyepiece in a convenient position,

With a sidereal drive,

Which is easy to slew by hand,

With slow motion axes oriented to the compass directions (north, south, east, and west, on the sky),

With a good wide-field eyepiece for finding things,

With one or more straight-through magnifying finders,

With finder aperture sufficient to see all the stars on my charts.

The virtues of solid mount and convenient eyepiece position are obvious. By “solid”, I mean both that the mount does not jiggle, and that it does not weathervane in wind. Add a sidereal drive to such a mount and your telescope will remain pointed accurately not only while the wind blows, but also while you check

your charts for the next step in the star-hop, or change eyepieces.

The easier hand slewing is, the more it can substitute for slow motions, and hand slewing is generally faster. My Losmandy G-11 came with lubrication that had hardened like glue in the bearings. I cleaned and re-lubed it, and gained an immense improvement in hand slewing, so much that I rarely use its electric slow motions when looking through the finder. I can often set on an object entirely by hand.

Having axes oriented to the compass points — or at least having a control-paddle mode for motion in those directions — means that when you know from your charts that you need to move the field northwest, you will be able to tell what direction that is at the eyepiece.

The wider the field in the main telescope, the more stars plotted on your charts will be visible at one time, and therefore, the easier it will be to know exactly where to look for an object that is not obvious at first sight. I use a 40 mm Erfle with my Celestron 14, which gives about a 40 arc-minute field, enough so there are usually several stars visible in it which are plotted on *Millennium Star Atlas*. Often more magnification makes it easier to see a galaxy, but I usually don't put in a higher magnification eyepiece until I am confident I know exactly where to look, and figuring that out generally takes a wide field.

I use magnifying finders instead of unit-magnification ones because I need to see more than just naked-eye stars to point the telescope accurately. I use straight-through ones because I can keep both eyes open and use the finder cross-hair as a reflex sight, fused by the brain with the view through the other eye. Users of this

trick will have little use for unit-magnification finders.

With my larger telescopes, there seems to be no place to put one finder so that it will always be convenient, so I use two, oriented about like the warp engine pods on the star ship Enterprise. They also serve to frighten off Klingons.

Have enough finder aperture to show all the stars on your deep-sky charts, but not too much more, or you will be confused by additional stars. In dark sky, with averted vision, a 10x40 or 8x50 finder will reach the eleventh-magnitude stellar limit of *Millennium*.

Several of these criteria seem to rule out undriven Dobson-mounted Newtonians. That is a bit too strong. I have used three Dobsons extensively for deep-sky work, logging between 1500 and 2000 observations with them altogether, but though Dobsons certainly give satisfactory views, I cannot find things as quickly with them as with my C-14. The main reasons why are confusion as to which direction is which in the eyepiece, inconvenient eyepiece position in larger Dobsons, and inability to walk away from the eyepiece without having the object walk away as well. I do not say I cannot find things at all with Dobsons, or recommend that you sell yours, yet I myself cannot find things as fast with them as with driven, equatorially mounted telescopes with handy eyepiece positions.

DEEP CHARTS:

To star-hop is to use the bright and obvious — stars — as stepping stones to the faint and subtle. You need enough charted stars to find many in every finder field,

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and to put a few in every low magnification field at the main eyepiece. For my big telescopes, the only amateur atlas with enough stars is *Millennium Star Atlas*, which goes 1.5 magnitude deeper than *Uranometria 2000.0* or the old AAVSO *Variable Star Atlas*. The popular *Sky Atlas 2000.0* has fewer stars still. Having charted stars visible means not just knowing that a faint galaxy is somewhere in the field, but knowing exactly where it sits with respect to specific stars. If you can only see the galaxy via averted vision, and only when you know exactly where to look, that is a big difference.

If you use a telescope smaller than my C-14, your low magnification eyepiece will likely have a wider field than forty arc minutes, so that you will be able to make do with a cheaper atlas, with fewer stars. Yet I cannot stress too much: If your atlas does not put several plotted stars in the field of your low-magnification eyepiece, you are cutting your throat before you start, for finding faint deep-sky objects fast.

I do use other atlases — I have an old Norton's *Star Atlas* that I use for orientation, when I am not sure where in the sky is the field I am looking at in my big atlas. You will probably need an atlas for that purpose, as well.

USING EQUIPMENT AND CHARTS:

There are two star-hopping tasks which I accomplish regularly. The first is finding an object “from scratch”, starting with the telescope pointed somewhere else entirely, with my atlases open to pages other than the ones I need. The second is a “differential” star hop, in which I start not far from the new object. Several sub-procedures and required bits of knowledge are common to both tasks, so let me describe

the pieces just once. Finding “from scratch”, involves the following steps, more or less in the order given. A “differential” star hop omits several, depending on whether I need to use the finder as well as the main eyepiece, which in turn depends on how far away the next object is.

Locate the Target Object on Your Deep Charts:

You should be familiar enough with your deep charts to know where in the stack of pages to look for any given constellation, or any given right ascension and declination. At least, you should know which way to turn the pages if you open to the wrong one.

Locate a Handy Start Point on Your Orientation Charts:

The starting point for a “from scratch” star-hop is likely a star or group of stars, sufficiently bright to be obvious to the naked eye, as close to the target object as possible. You will use your orientation charts to locate one. The knowledge you need is the same notion of what's on which page that you need with your deep charts. Many lists of targets identify the constellation where objects are located, so it also helps to have an idea where all the constellations are, or at least, where they are located with respect to the bright and obvious ones. Thus you should know that Sextans and Crater are generally south of Leo.

Lining up for Finder Star-Hopping:

Swing the telescope so it points generally toward your chosen start point. With both eyes open, look through one of its straight-through finders, and move the telescope so the image of the finder cross-

hair, as seen with the eye using the finder, moves toward the start point, as seen with the other eye. When the start point is close enough to where the finder is pointing, the start point will appear in the finder field. If the finder is inverting (some straight-throughs are not), it will appear on the side opposite where you see it with the non-finder eye. In any case, line the start point up with the crosshair. But don't look through the main eyepiece just yet, we'll see why in a moment.

Star-Hopping in General:

The essence of star-hopping is the selection of patterns of stars on your charts that are easy to recognize, and that are small enough to fit inside the field of view with plenty of slop left over, so you can still recognize them even if they are not perfectly centered. That is true whether you are using the finder or the main telescope for star-hopping.

Unfortunately, I cannot easily tell how to pick the right patterns. There is a knack to it. Getting a pattern small enough to fit the field is the easy part, what's hard is picking something that stands out in that particular area of sky. If most plotted stars in that area are isolated single stars, then a small group of two or three may be a good pattern, but if there are lots of such groups, you might want to pick something else. If there are lots of isolated sixth-magnitude stars, you probably don't want to use any one of them by itself as a pattern. And so on.

You also need either a good visual memory or a set of concise descriptive names, to remember what the patterns look like for the short interval as you step from chart to telescope. I use several geometric

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names, like “straight line”, “equilateral triangle”, “right triangle”, “isosceles triangle”, “square”, “parallelogram”, “circle”, and “trapezoid”. I also have some fancier descriptive names that work for me. I have tried to set up the following text with a constant-width font, so that I can show what some of them are in the next few lines. Don’t feel obliged to use my patterns, though — pick ones that work for you.

reverse the image, and neither do straight-through finders, or refractors and Cassegrain systems used without star diagonals, or finders with fully erecting diagonals. If the image is reversed, you must mentally reverse what appears on your charts, when you step to the eyepiece. There is a knack to doing that as well, and I have no way to describe how to learn it. All I can say is that it can be learned. It might help to look the wrong way when you are crossing the street, or

You also have to know directions. Maintain the habit of keeping track of which way north, south, east and west are in the finder and main telescope eyepiece at all times, even if one is reversed and the other isn’t. When you rotate the star diagonal to a new position, make sure you still know which way is which. It helps to have slow motions that move the telescope in these specific directions, to remind you. Note that many people are confused by directions on star maps any-

way: On a map of the Earth, you are looking down from the top, so if you orient the map with north up, east is on the right and west is on the left. On a star map, you are looking up from the bottom, so if you orient the map with north up, east is on the left and west on the right. That’s one more thing to think about in addition to whether or not the optics reverse the field.

It may also help to think of directions using the face of a clock, with 12:00 being north. It is pretty easy to convert back and forth for reversed fields. Just imagine a clock dial and you can easily see, for example, that what is opposite to 9:30 is 2:30, and so on.

Your finder and telescope

field diameters are natural yardsticks for star-hopping. If you don’t know how big they are, you will get lost. Some recommend circles drawn on clear plastic, one field in diameter at your charts’ scale. I

There is a complication if the optical system reverses the image. Refractors with star diagonals and Cassegrain configuration telescopes with star diagonals reverse the image, as do finders with simple 90-degree star diagonals. Newtonians do not

to practice tying your shoes with knots that are mirror reversed from what you usually use. I don’t say for sure that it will help, just that it might, and do be careful when you are crossing the street.

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don't use them, because my charts all show how big a degree is. If you know your field diameter in degrees, as well as how big it looks on the chart, you have two ways to navigate. You can either "go half a degree", or "go three-quarters of a field".

Thus a set of "directions" for a star-hop, that I remember from my charts as I walk to the eyepiece of the main telescope, might be, "Go a field and a half east to the arrow pointing east/west. Then turn left 45 degrees (that would have been "turn right" on the charts, if my optics were reversing) and go two arrow-lengths to an equilateral triangle that is about half a field wide. The galaxy is about 40 percent of the way down the west side of the triangle, a little within the triangle itself." I can remember all that until I get to the eyepiece, most of the time, and I can also usually remember that the field is reversed in my C-14, and that the way the star diagonal is rotated right now has north — say — downward and to the left of the center of the field.

With "clock" directions, and with reversing optics, that same star hop would be "Go a field and a half toward 3:00, then two arrow-lengths toward 1:30..."

A finder star-hop might be "Go a field and a half north, to a wide pair of bright stars, then another field and a half to a much closer, prominent finder double." I would then set the cross-hair on the finder double. But I would *not* look through the main telescope immediately, to be sure I had the finder double in sight. Why bother? If it's not there, then my finder has slipped in its bracket, or the drive has stopped, or something else is wrong, and that doesn't happen very often. Before I look through the eyepiece, I go to the

charts again, to memorize the directions for the main-eyepiece star-hop from that finder double to the actual object. There's no point going to the eyepiece unless I know what I have to do when I get there.

PLANNING AND OBSERVING SYSTEMATICALLY:

What you do in the field is the tip of the iceberg of an observing program. Preparation is important, so you will do what you set out to do, and so you will do it without wasting time.

I generally have a master target list for my current program, or at least a set of charts with a plan to observe what's on them. From them I prepare a one-night list of objects not yet looked at, in areas of sky that are well placed as the night wears on, with consecutive targets short star-hops apart. I usually order objects by increasing right ascension, in long east-west strips whose north-south extent matches the width of my charts. Thus most star-hops are differential, over short distances, and take much less time than star hops from scratch. In some parts of the sky, objects are so close together I may not need the finder for hours, till the next long hop to a target, as when starting a new strip of sky.

About all that remains to be said in this section is to do what you plan. Prepare an observing list for each night, take it along with you when you go out, and use it.

CREATURE COMFORTS:

It's hard to do anything well when you are uncomfortable, except maybe whine, and there are a lot of creature comforts to improve your efficiency. There are enough for several articles, but let me say at minimum that you should make sure

you are warm, well-rested, and well-fed when you observe, and not get sore muscles or cramps from staying in one position too long. When I observe, I carry lots of warm clothes and plenty of instant edibles, as well as good instant coffee and several thermoses of hot water. I have catalytic hand warmers for when it is really cold.

I wish I could build a chart stand, so I could use my charts from the telescope, but I do not know of a good design. The requirements are stringent. Such a stand would have to hold a volume of *Millennium*, plus a notebook for observing lists, plus my orientation atlas, all at eye level, close enough for me to see in dim light without getting out of my observing chair. It would have to protect the paper products from dew, without providing any surface on which the dew could condense and hide the paper. It would have to be sturdy enough not to blow over in the breeze, and light enough to move easily when I switch from one part of the sky to another. Think of a high-tech music stand, with a hood over it, open at one side, ballasted and with legs far enough apart so it won't tip.

I don't have one of those, but I do have a wide, flat, plastic box that holds my *Millennium* open, with a piece of Lexan that nearly spans it, to keep the pages from getting soggy or blowing over. In dry weather, I sometimes set it up on a table near the eyepiece; otherwise, I leave it inside my van, where the Lexan is out of the dew.

See, finding stuff quickly isn't that hard. Just don't talk about those Klingon battle cruisers loud enough for anyone else to hear you. And keep your phasers ready to fire.

Treasurer's Report — January 2001

— Duane A. Yockey, Treasurer

OPERATING FUND BALANCE – December 31, 2000 \$ 1,161.58

Income

Tim & Sallie Tyrrell (dues) -	\$ 25.00
Robert Wagner (dues renewal) -	\$ 25.00
Steven & Patty Blair (dues renewal) -	\$ 25.00
Donation towards banquet	\$ 5.00

Expenses

None!!!

OPERATING FUND BALANCE – January 31, 2001 - \$ 1,241.58

OBSERVATORY FUND BALANCE – December 31, 2000 - \$601.45

Income

None

Expenses

None!!!

OBSERVATORY FUND BALANCE – January 31, 2001 - \$601.45

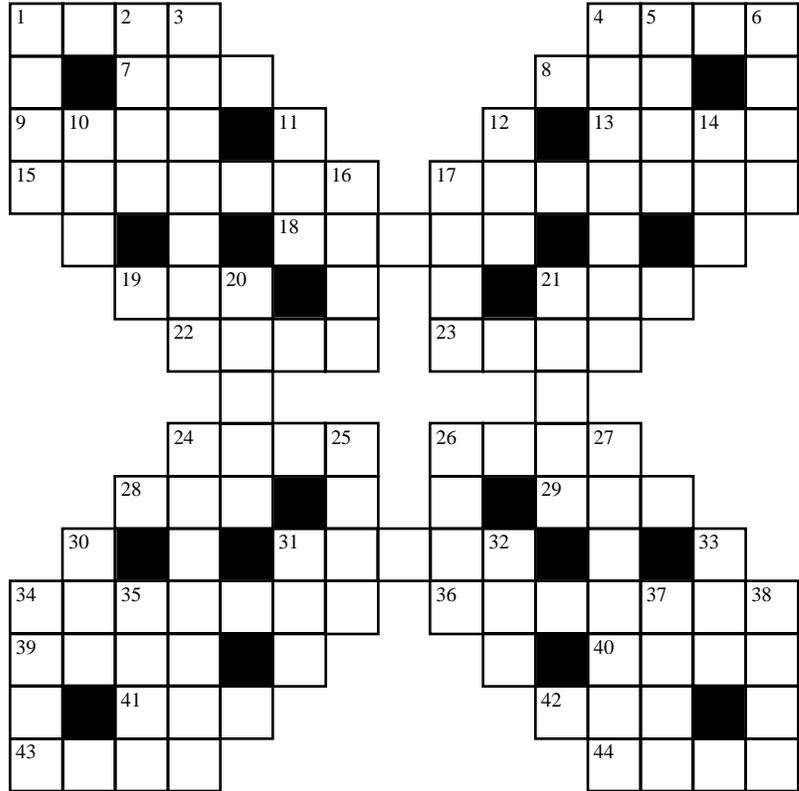
TOTAL TCAA FUNDS – January 31, 2001 - \$1,843.03

The Observer Crossword

—Observer Staff

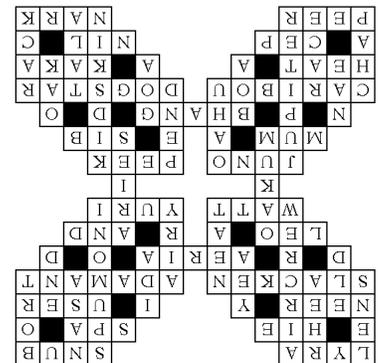
ACROSS

- 1 Constellation : The lyre
- 4 Rebuff
- 7 Hasten
- 8 Mineral spring
- 9 Never
- 13 A person that uses
- 15 Make less taut
- 17 Inflexible
- 18 Operatic feature/bright region on Mars
- 19 Constellation : The lion
- 21 Besides
- 22 The physical unit for measuring power
- 23 First man to orbit the earth - ... Gagarin
- 24 Fourth largest asteroid
- 26 Peep
- 28 Silent
- 29 Akin
- 31 Cannabis
- 34 Reindeer of North America
- 36 Another name for Sirius (3,4)
- 39 Thermal energy
- 40 New Zealand parrot
- 41 Brown-capped boletus mushroom
- 42 Naught
- 43 Noble
- 44 Stool pigeon



DOWN

- 1 Glass device used for focussing light
- 2 Moon of Saturn discovered in 1672
- 3 Crew of an aircraft
- 4 Ice cream
- 5 Initials of the American space authority
- 6 Low-quality diamond
- 10 Antiquity
- 11 Affirmative reply
- 12 Guardian of the Dark (Sky)
- 14 Conclusion
- 16 Trim
- 17 Disk on which 84% of star's light is concentrated
- 20 Loose fiber used for caulking
- 21 Constellation : The ram
- 24 The largest planet
- 25 Island of Hawaii
- 26 Remain undecided
- 27 Skin of a young goat
- 30 Not
- 31 Fur scarf
- 32 Tibetan gazelle
- 33 Tree of the genus Quercus
- 34 Fellow
- 35 Speed contest
- 37 Monetary unit of Western Samoa
- 38 Tiered shelves



The Welcome Mat

Another family joins the TCAA family! A warm (really warm, it's still February!) welcome for our newest members...



Tim & Sallie Tyrrell
Normal, IL



The OBSERVER

The Newsletter of the Twin City Amateur Astronomers, Inc.

Michael Rogers & Jean Memken, Editors
2206 Case Drive
Bloomington, IL 61701

Dues Due?

The Dues Blues

If you see a check in the box above, it means **your dues are due**. To retain membership -- and with a new observatory, why quit now??? -- please send \$25 to our esteemed treasurer:

Duane Yockey
508 Normal Avenue
Normal, IL, 61761

As always, thank you for your support!!