The OBSERVER

The Newsletter of the Twin City Amateur Astronomers, Inc.

March 2001 Volume 26, Number 3

In This Issue:

Officers! We Have Officers!

Meet The New Boss(es)...

—Michael P. Rogers

THE new Board of Directors, elected at the February banquet, has met at last. For a variety of reasons, they were unable to do so until this last week — and in consequence we've delayed publication of The Observer so that we could report on their discussions and deliberations. Under our bylaws the Board of Directors manages all TCAA business, and during their first, critical meeting, establish the year's agenda and elect officers.

President McNamara!

Here, for posterity, is what happened during that august, March event.

On March 28th, at 7:30 PM, at the Barnes and Noble cafe, the meeting was brought to order. In attendance were board members Sandy McNamara, Dan Miller, and Duane Yockey. Club members Michael Rogers, Jim Swindler, and periodically Sarah Rogers, were also in attendance.

The meeting began with outgoing presi-

continued on page 6

Celebrate the Science. Admire the Art.
Astronomy Day @ Eastland, April 28th.

TCAA Calendar

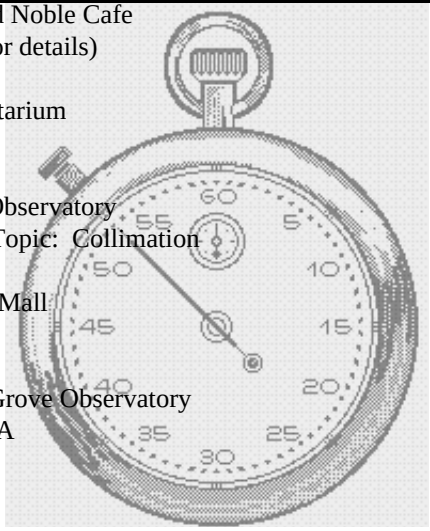
Monday, 2 April, 7:30 - 9:00 PM, Barnes and Noble Cafe
Astronomy Day Planning Session (see p. 4 for details)

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

Saturday, 21 April, Sundown, Sugar Grove Observatory
Members Only Observing Session. Special Topic: Collimation

Saturday, 28 April, 10 AM - 4 PM, Eastland Mall
Astronomy Day Exhibit

Saturday, 28 April, 8:30 - 10:30 PM, Sugar Grove Observatory
Public Observing Session. Coordinator: TBA



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.

Observing Galaxies

— Sandy McNamara

SPRING is prime hunting season for galaxies, one of my favorite types of deep sky object. Galaxies come in a wide variety from pinwheel shaped spirals to tiny round ellipticals and, my personal favorite, the ghostly needles of the edge-on galaxies of various types. Most of the objects in the sky (open clusters, globulars, planetary nebula, etc.) are members of our own Milky Way galaxy, but when you start observing galaxies you turn your attention from our local neighborhood and probe *really* deep space.

M104, the Sombrero Galaxy, as you would not see it in a small telescope

There is something awe-inspiring about realizing that the smudge of light you are looking at is due to the combined glow of several hundred billion stars, so far away that you are seeing them as they actually existed long before Homo sapiens even evolved.

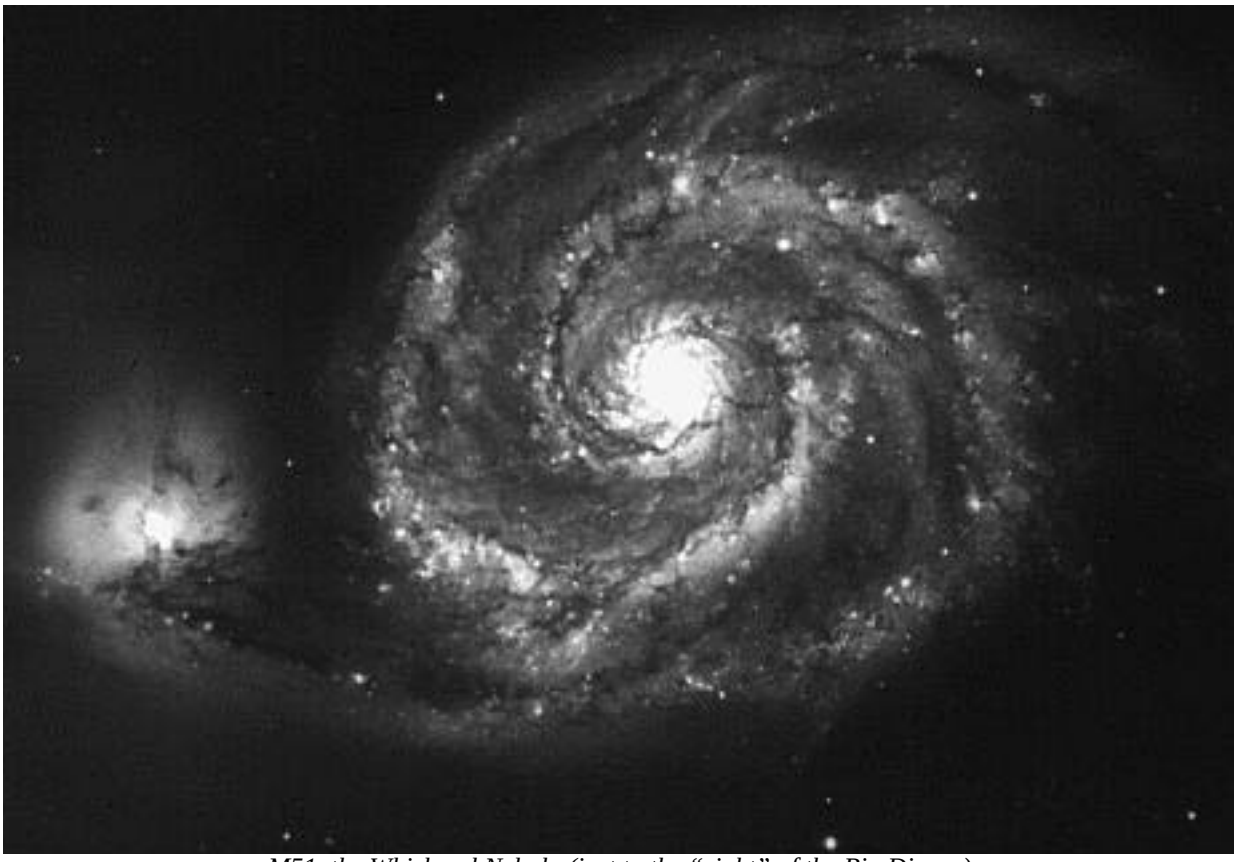
Unfortunately, locating and observing galaxies can often be rather difficult for beginning astronomers. This is not because they are small in size (many are almost 1/4 the apparent diameter of the full moon and most I've observed are at least 1/10 of its size) or small in number (over 3/4 of the objects in the NGC catalog of 7000+ deep sky objects are galaxies). The problem is that most galaxies have a low surface brightness — their light is spread over a large area so individual parts appear dim. It cannot be stressed enough that the most important key to successfully observing galaxies is finding a dark sky site from which to do so. Large telescopes with premium eyepieces and expensive ancillary equipment will not do as well finding galaxies as a small telescope IF the smaller telescope is located under darker skies! Galaxies that are impossible to find observing within the Bloomington/Normal city limits are often no problem at the TCAA's dark sky observing site at the Sugar Grove Nature Center ... and almost embarrassingly easy from really dark sky sites such as those at the Nebraska Star Party.

How you perceive the brightness, size, and shape of galaxies *does* depend on

continued on next page

continued from previous page

what size telescope you are using as well as the darkness of the skies you find them in. After all, the main purpose of a telescope is to make objects *brighter* (not bigger) and a larger telescope simply gathers more light. A 4-in reflector or small refractor will reveal several hundred examples of various types of galaxies, but generally you'll have to be satisfied with simply *finding* them and appreciating what they represent. If you are using a 3-in or 4-in telescope, you will probably only see the brighter central part of the galaxies, so be prepared to look for nebulous or definitely fuzzy "stars" while 6-in to 8-in telescopes reveal objects more easily recognizable as a galaxy. With 10-in and larger telescopes, you should begin to see possible details that might include dust lanes, mottling or spiral structure, or brighter "HII" areas in the outer regions of the galaxy's halo.



M51, the Whirlpool Nebula (just to the "right" of the Big Dipper)

Do not depend on the object's listed magnitude to determine if you should be able to see a particular galaxy. Aside from a wide variability depending on which source you get your magnitude information from, the magnitude is the based on the *average* brightness of the galaxy and usually indicates what the magnitude would be if you compressed all the light of the galaxy into a single point source like a star. A 12th magnitude galaxy that is small in size with much of its light concentrated in a bright central core will often be more easily visible than a 10th magnitude galaxy that spreads its light over a larger area and has a lesser concentration of its light in the center. The visibility of extended area objects such as galaxies is also very dependent on the transparency of a particular evening's sky. There have been many times I have discovered a galaxy that was easily visible on one evening to be totally invisible on another night that seemed at first glance to be of similar atmospheric condition. Whatever size telescope you are using, don't give up on a target until you have tried finding it on several different nights, and have used various magnifications, in attempting to see it.

Always start your search using the lowest power eyepiece you have. Most galaxies will be seen more easily in a wider field of view as a slightly hazy patch that you catch at the "corner of your eye" (averted vision technique) and/or a fuzzy "star" that doesn't want to focus as clearly as the other stars visible in the field. Once you have located a galaxy (or *think* that "fuzzy star" might be one <g>), gradually switch to higher magnifications to attempt and discern its true nature or see any further details. It should be noted that "light pollution" and narrow band filters such as the Orion Ultrablock, Lumicon UHC or OIII and similar filters do NOT usually improve viewing of galaxies as they improve the views of other various types of nebula. These filters act by darkening the background sky glow while allowing the light of the target to pass through relatively unimpeded, thus increasing contrast and making the target easier to see. Galaxies emit their light over a broad

continued on next page

spectrum of wavelengths, and use of a filter merely dims most of the light from the galaxy along with the background.

When observing galaxies, some questions to ask yourself might be: Can this galaxy be seen with direct vision or is averted vision required? What is the overall shape (round, oval, needle shaped, lens shaped, irregular)? If the galaxy is not round, how out of round is it (i.e., sl oval, elongated 2:1, 3:1, etc.)? If elongated, in which direction is the longer axis oriented (i.e. does it lie N-S, ENE-WSW, at a position angle of 45 degrees, etc.)? Is a brighter core visible or is the galaxy merely a uniform haze of light? Is the core compact (like a stellar dot in the middle) or does the galaxy just gradually brighten toward the middle? Can any detail be seen between the core and the outer envelope of the galaxy? Are the edges of the outer envelope sharp or does it just gradually fade from view so that you can't tell where it actually ends? Can any detail or mottling be seen in the outer envelope (bright or dark patches or lanes)? Are there any faint stars superimposed on top of or near the edge of the galaxy? At what magnification do you think the galaxy looks best? Are there any details that are visible at some magnifications and not others? Are there any other deep-sky objects in the same field of view (and if so, what?)?

When searching for fainter objects in the skies, I find it is easier to concentrate on one small area or constellation for the evening rather than jumping randomly across the skies. It can often take a little time with a star atlas at the beginning of a session to get oriented to the placement of the stars in a specific constellation (or even *finding* some of the more obscure constellations!), but once you locate the major guideposts you will be using for the evening, it becomes less difficult to find them again if you haven't wandered too far away from them. An enjoyable way to spend a cloudy evening is to sit down with a detailed star atlas and plan a "star hop" to find a series of targets within a constellation by moving a certain number of eyepiece field-of-views from one item to the next. Additionally, you will be finding small asterisms, or distinctive grouping of stars, as you move across the skies searching for your target that serve as recognizable signposts when you see them again. I've often had to just go back to "that little butterfly shaped group of stars" when I realized I had probably missed my target and need to start over again from a point where I knew where I was!

Astronomy Day

— Michael P. Rogers

APRIL 28th is the day, Eastland Mall is the place, and 10 AM - 4 PM is the time... the time when we celebrate all things Astronomical and share our interest and love of the subject with the public.

Our second plennary session will be on Monday, April 2nd, at 7:30 PM, at the Barnes and Noble Cafe — in lieu of the TCAA Reading Group (which will make an undoubtedly triumphant return in May). By the time you read this that meeting may have already transpired; however you can contact any of the organizers, and indicate what you would be willing to do, and for what portion of the day. As you can see from the lists below, there are ample opportunities for volunteers! Those who have participated in previous Astronomy Day exhibits have found it rewarding, and educational for both you and those you converse with.

Potential Displays:
- Telescope Displays
- Computer Software Displays
- TCAA Theater (sci-fi flicks)
- SGO
- Light Pollution Awareness
- Mirror Grinding

Possible Activities:
- Who Wants To Be An Astronomaire?
- Telescope Assembly (for kids)
- Map Out the Solar System (for kids)
- Alien Art Contest (for kids)

Possible Giveaways:
- Hubble Space Telescope
- Abrams Sky Calendars
- Sky and Telescope
- ISU Planetarium Paraphernalia

We will need people to obtain supplies; work on publicity (absolutely critical); coordinate posters; etc., etc. There will be much conversation, starting next week, on the E-mail list, so please stay tuned! One highlight of the event will surely be "Who Wants to be an Astronomaire?". WGLT announcer Jim Browne will serve as host, on his birthday, no less — and that means we're sure to have large crowds on hand!

The ISU Planetarium will be offering free shows that day, and we will be promoting that heavily. If we can spare one or two people to do some solar observing at the Planetarium (and steer them to the mall afterwards) that would be excellent.

The Joys of E-Mail

— Michael P. Rogers

E-MAIL is, at the onset of the 21st century, ubiquitous in industry and academia, and for good reason: it provides a virtually instantaneous, reasonably reliable, "costless" form of communication. Not only can you send text, but through attachments images, programs, indeed any file whatsoever, from one user to another.

Uses:
At a rough guess, 2/3 of the TCAA are members of our very own personal e-mail list, courtesy of yahoogroups.com. This list, maintained by Al Timke, serves us in numerous ways. First, it provides an incredibly convenient way of quickly informing members about news, upcoming events and the inevitable last-minute change in plans. Here are just a few examples of how it has been/can be used:
• announce that an observing session has been scrubbed due to bad weather
• unannounce the scrub, because the weather has now cleared up :-)
• appeal for an observing buddy
• inform members about an article/images on a web site
• solicit opinions
• welcome new members

In short, the list can serve as an online gathering place to discuss anything and everything related to astronomy, and particularly the TCAA.

If you join the list — and I'll tell you how to in just a moment — then you'll find that your whole perception of the club changes. It isn't an occasional gathering, perhaps once or twice a month (or, in the case of some lurkers, a year), but a pleasurable on-going dialog about astronomy, both theoretical and observational,

How To Join:
First, you'll need a computer. Most of our members have access to one, I suspect; for those who don't, if you are financially solvent, then places such as Connecting Point, or any of the large retail chains (Best Buy, Circuit City, Radio Shack, Sears, etc.) can help you out. If you are hurting for cash, many places will sell you a "free" computer with a 36 month contract with an Internet Service Provider — and you'll need internet access anyway. You can also try Computer Renaissance, or the want ads, where you can find decent equipment — not cutting edge, but certainly good enough to handle e-mail — at affordable prices. If you are *really* desperate, I have a couple of computers that I need to unload :-)

Computer in hand (or in lap, or on desk, or wherever), and internet connection established, you may use one of two methods to join the mail list. Either:

a) use your web browser to visit groups.yahoo.com/group/TCAA/join
b) send a blank e-mail message to TCAA-subscribe@yahoogroups.com

Features:
Beyond e-mail, yahoogroups.com provides us with a second web site (distinct from twincityamateurastronomers.org) that has several helpful features, such as:

• Chat, where users can gather and talk interactively

• Polls, where anyone can ask a question, and others will be prompted for their opinions
• Files, a place to store files of any sort
• Calendar, to remind users of upcoming events

To use any of these, you will need to join yahoogroups. Merely cruise over to groups.yahoo.com/group/TCAA and click on Join This Group.

A Few Caveats:
E-mail is an imperfect form of communication. Because its users are physically isolated, everything is boiled down to text; nuances of speech, body language, all the verbal and visual cues that we subliminally utilize in a face-to-face conversation are lost. The result can be dreadful misunderstandings.

Emoticons — conveying happiness :-), sadness :-(, dismay :-0, etc., can help to a certain extent, but for complicated conversations, wait until you can at least talk to the person on the phone — especially if you don't know them too well.

continued from p. 1

dent Dan Miller presenting the agenda for the meeting. The first item was a question as to who had custody of the TCAA scrapbooks. It was theorized that this author did, although he denied all knowledge. Once the scrapbooks are located, Dan offered to digitize them and put them on the web for future reference.

We discussed the question of Observatory Manager. Dan volunteered and was unanimously elected into that position. His first official act was to offer to put up bookcases to hold the TCAA library, and re-lubricate the declination slow-motion motor on the C-14, which, after 20 years without, was feeling a wee bit thirsty. Three or more 36" deep bookshelves will be placed on the second floor, affixed to the southern wall.

Item 2 involved the establishment of an education liaison officer. Jim Swindler volunteered and his offer was gratefully accepted. The liaison's duties will be to liaise with the schools, i.e., schedule observing sessions and/or presentations when called upon to do so, and make our existence known to teachers in area school systems (and faculty in community colleges and universities).

Treasurer Duane Yockey presented the State of the Club report. He began by distributing Treasurer's reports for February and March — the latter being preliminary since the month had not yet concluded. Duane reported that the club is in reasonably good health financially, with a total of nearly $1900 available. Some of that will be spent on major fixed expenses: insurance, Astronomical League dues, and on our Abrams' Sky Calendar subscription. A perfunctory discussion of AL membership was held. The board felt that AL membership was very important, and well worth the cost.

It was decided to purchase some educational packages from the Astronomical Society of the Pacific, so that we could have "canned" programs that anybody could use for presentations for school groups and at the Bloomington Public Library. A total of $200 was approved for that purpose — Sandy planned to select several, and report back to the board. A similar amount was approved for the purchase of eyepieces for the C-14.

The question of funds for observatory maintenance then arose. The board concluded that keyholders should be assessed a minor fee, $10 annually. Compared to the cost of access to a fully-equipped observatory the amount is minor, but would help defray costs of maintenance.

This segued into a conversation about fund raising that threatened to keep us until closing. Dan was elected into the office of fundraiser, and volunteered to raise funds for an LX-200 16". Some expressed skepticism as to whether he could do this within a year, but hoped to be proven wrong.

The Public Observing Schedule for the year (see article, p. 7) was formally presented and accepted. Michael noted that Astronomy Day was approaching, mentioned that a meeting would be held on Monday to hash out details, and invited all present to attend. Dan remarked that we have already have received several presentations for the upcoming year — from ISU Planetarium Director Tom Willmitch, and from BPL Bookmobile staff.

Speaking of which, Tom has graciously offered the ISU Planetarium as a place to hold our monthly meetings. We haven't *had* monthly meetings as of late — the TCAA Reading Group and the MOOSs have served in their stead. However Sandy noted that this was unsatisfactory for a number of reasons; and that several members have told her that they missed the public meetings at the planetarium. After much discussion the question of where to meet, and possibly a new format for general meetings, was tabled.

A date for the Summer picnic was chosen: 28 July, 2001. This coincides with a public observing session, the plan being to eat first, entertain later :-). We already have the SGNC booked for that evening, so there won't be any scheduling problems.

Having read this far, you are undoubtedly wondering, what about the election of officers? Who's *really* in charge? <OSCAR VOICE>May I have the envelope please? The winners are...</OSCAR VOICE>

President: Sandy McNamara
Vice-President: Brian Barling
Third Director: Jim Baker
Fourth Director: Duane Yockey
Fifth Director: Dan Miller
Secretary: Michael Rogers
Newsletter Editors: Jean Memken, Michael Rogers
Property Manager: Sandy McNamara
Librarian: Karen Moen
ISU Planetarium Liaison: Michael Rogers
Registered Agent: Sharon MacDonald
AlCor: Duane Yockey
Historian: Jean Memken

Under The Dome

— Tom Willmitch

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

Explore the April night sky and learn about NASA's latest space mission during this live planetarium presentation. Under the Planetarium dome we will locate the planets, bright stars, and the constellations found overhead after dark. The Planetarium's Thomas Willmitch will then speak about NASA's Mars Odyssey Orbiter mission, scheduled for launch that day. *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.

Support Your Local Planetarium!

Public Observing Sessions (POSs)

Date	Time	Astronomical Twilight
31 March, 2001	7:30 - 9:30 PM	7:20 PM
28 April, 2001	8:30 - 10:30 PM	8:32 PM
26 May, 2001	9:00 - 11:30 PM	10:14 PM
23 June, 2001	9:00 - 11:30 PM	10:36 PM
28 July, 2001	9:00 - 11:30 PM	10:17 PM
25 August, 2001	8:30 - 10:30 PM	9:17 PM
22 September, 2001	8:00 - 10:00 PM	8:24 PM

All POSs are free and open to the public, but TCAA members are especially encouraged to come out. Sky charts and munchies will be provided by the coordinators and/or their seconds. In the event of rain, the event will be canceled.

March SpotLight — Leo

— Sandy McNamara

AFTER perhaps only Ursa Major, Leo, the lion, is the easiest constellation to identify in the northern spring sky. A distinctive backwards question mark or sickle forms the mane and chest of the lion and a large triangle of stars to the east denotes the back end of the reclining beast. One of the brighter stars in the spring skies, Regulus (alpha Leo) marks the handle of Leo's sickle and is the leader of the 4 "royal" stars used in ancient Persia and many other cultures to honor the four quarters of the heavens (the other three are Antares, Fomalhaut, and Aldebaran).

Leo contains several interesting double stars. Regulus itself is an easy double star for any telescope. Only low magnification is needed since the separation is quite wide, over 10 times the distance that separates the two companion of the better-known Mizar in the handle of the Big Dipper, and it can often be separated using 10x50 binoculars at a dark sky site. Look for a much fainter star to the NW. Located in the sickle of Leo, gamma Leo can be separated into a nice double star at about 100x. Gamma is a true binary star (as opposed to being a visual double caused merely by line of sight), with the two stars orbiting each other by about 3 times Pluto's distance from the Sun. The more difficult to find 54 Leo, above the lion's back about 9 degrees E of zeta Leo, is also easily separated using only 100x; using a Telrad finder with brighter delta and zeta Leo for reference can help to locate it.

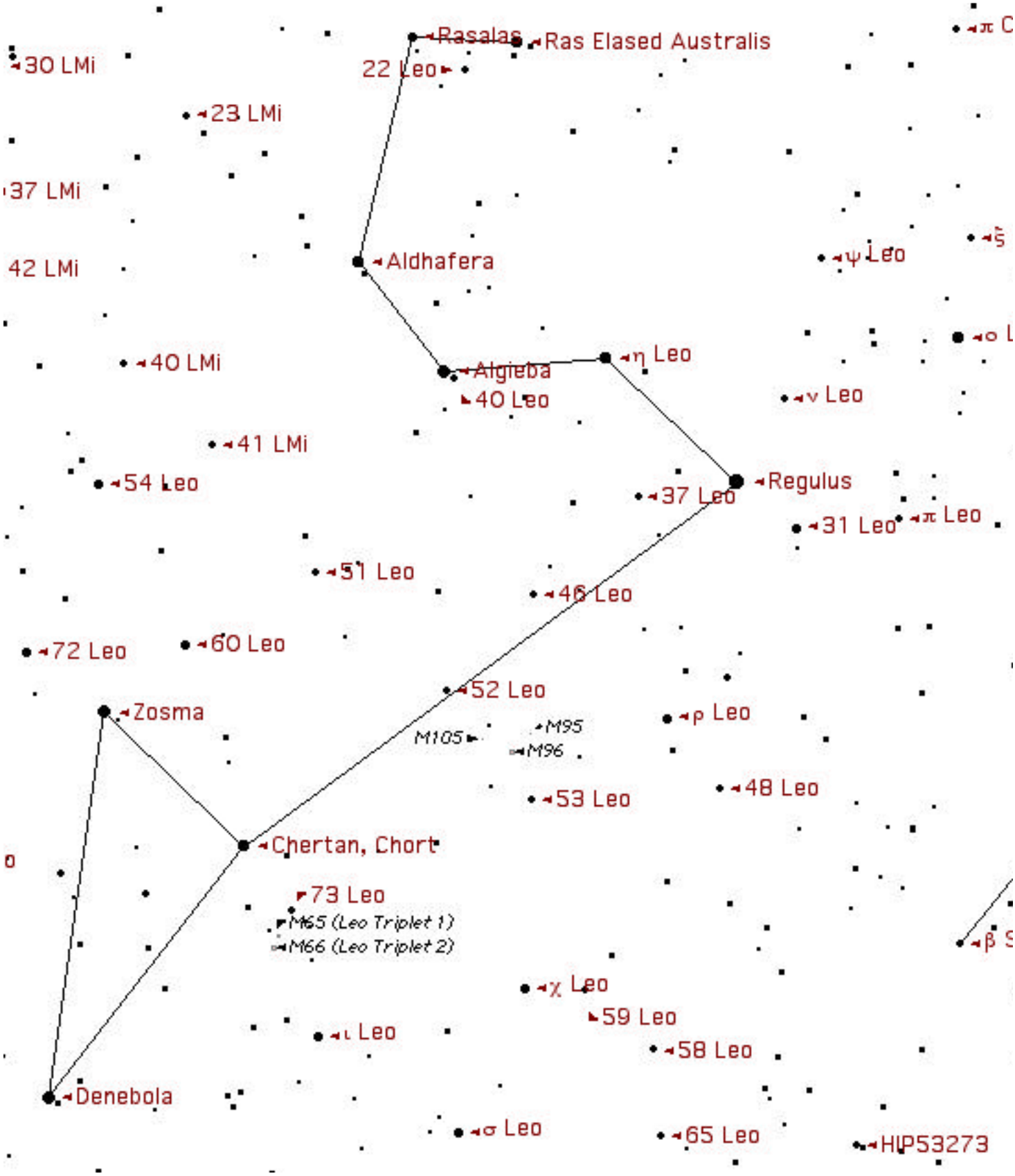
Point your telescope about 3 degrees SE of theta Leo (the SW corner of Leo's rear triangle), halfway between theta and iota Leo, to find what is commonly referred to as the "Leo triplet", 3 fairly bright galaxies that can be placed in the same low power (at least 3/4 degree) field of view. M65 and M66 are similar sized ovals and both sl elongated in an approximately N-S orientation; M66 is the sl brighter one toward the ESE. NGC 3628 is a little over 1/2 degree NE of the M65/M66 pair; a bright field star lies about halfway between M65 and NGC 3628. This is a nice edge-on galaxy about twice as big but much dimmer than M65 or M66. Look for a faint oval smudge oriented E-W. Studies indicate that all three lie about 32 million light-years away and appear to belong to the Leo Galaxy Group, along with M95, M96, and M105. If you are using an 8-in or larger telescope, you should be able to find NGC 3593 just a little over 1 degree W of M65/M66, or 2.5 degrees S of theta Leo. Look for a faint galaxy sl elongated E-W, about half the size of M66.

Sweep 9 degrees W of Regulus or 2 degrees S of 52 Leo, magnitude 5.5 (which I always think of as the lion's "belly button") to locate M95 and M96 in the same low power field of view. M96 is also about 3 degrees NW of 4th magnitude rho Leo, on a line from rho to theta Leo. Dimmer than either M65 or M66, look for a faint roundish glow with an almost stellar central core. The slightly dimmer M95 about 3/4 degree to the WSW of M96 is very similar in appearance. Both galaxies, along with nearby M105 and several even fainter surrounding galaxies are believed to be about 29 million light years from the Milky Way

M105 may be found just over 1 degree NNE of M96 or 1/2 degree S of the star 52 Leo. Seen face-on, in smaller telescopes it may appear as a nebulous "star". You very likely will spot an almost identical galaxy, sl smaller and dimmer, only 10_ NE of M105; this is NGC 3384. You might also notice a pretty little double star (Struve 1472) about 1/2 degree NNW from M105.

Name	Type	RA	DEC	MAG	SIZE/SEP	PA	LIST*
ılpha (32) Leo, Regulus	DS	10h 08m	+11d 58m	1.4/7.7	177"	307	DS
ǧamma (41) Leo	DS	10h 20m	+19d 51m	2.2/3.5	4.4"	125	DS
NGC 3351, M95	Gal	10h 44m	+11d 42m	11.2	8.5' x 5.0'	13	M
NGC 3368, M96	Gal	10h 47m	+11d 49m	10.5	7.5' x 5.0'	5	M
SAO 99287, Struve 1472	DS	10h 47m	+13d 02m	8.1/8.8	38.2"	38	
NGC 3379, M105	Gal	10h 48m	+12d 35m	9.6	3.8' x 3.8'		M, H
54 Leo	DS	10h 56m	+12d 45m	4.5/6.3	6.5"	110	DS
NGC 3593	Gal	11h 15m	+12d 49m	11.8	5.2' X 2.1'	92	H
NGC 3623, M65	Gal	11h 19m	+13d 05m	10.5	9.5_ x 2.3_	174	M
NGC 3627, M66	Gal	11h 20m	+12d 59m	10.0	9.0' x 4.2	173	M
NGC 3628	Gal	11h 20m	+13d 36m	11.5	15.5' x 4.3'	104	H

*For those of you working on various observing projects, the individual objects are included with following "hit lists": M = Messier or Binocular Messier, H = Herschel 400, DS = AL Double Star



Leo, in all its glory (courtesy of Starry Night)

Treasurer's Report — February 2001

— Duane A. Yockey, Treasurer

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

Income

Lucyna Cabaj (dues) -	$ 25.00
Mark Cabaj (dues renewal) -	$ 25.00
William Carney (dues renewal) -	$ 25.00
Joe DeHoff (dues renewal) -	$ 50.00
Roger Eggleton (dues renewal) -	$ 25.00
Sandy McNamara (dues renewal) -	$ 25.00
Jim Baker (dues renewal) -	$ 50.00
Lenore Trainor (dues renewal) -	$ 50.00
Donation towards banquet	$ 65.00

Expenses

Jean Memken (Banquet Expenses)	$24.69

OPERATING FUND BALANCE – February 28, 2001 - $ 1,556.89

OBSERVATORY FUND BALANCE – January 31, 2001 - $601.45

Income

None

Expenses

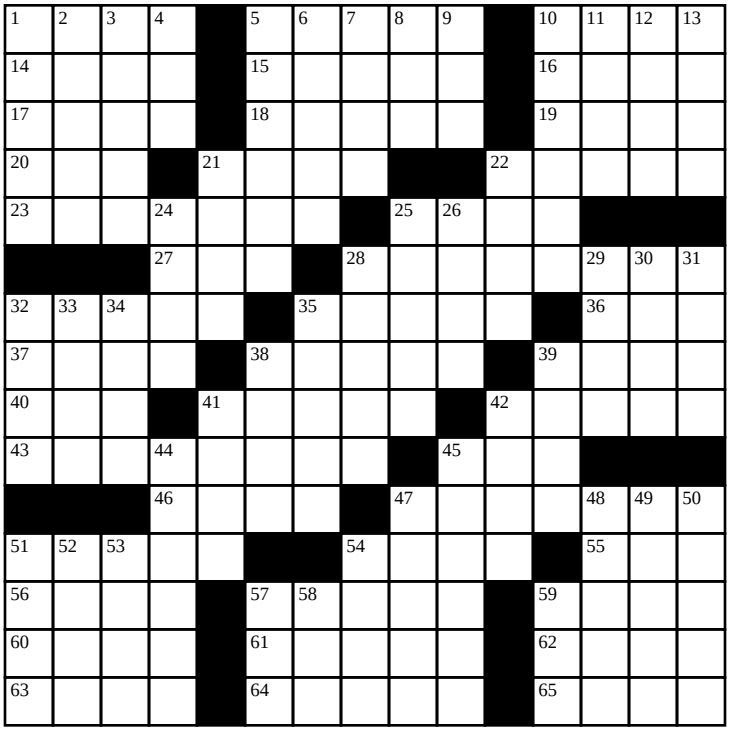
Jim Baker (Bldg. Materials)	$291.91

OBSERVATORY FUND BALANCE – February 28, 2001 - $309.54

TOTAL TCAA FUNDS – February 28, 2001 - $1,866.43

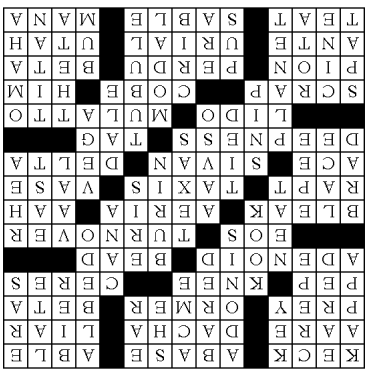
The Observer Crossword

—Observer Staff



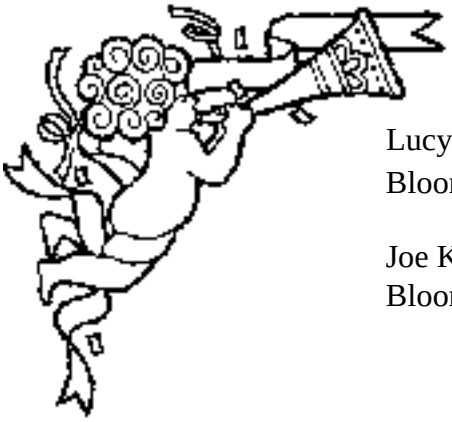
ACROSS
1 Hawaiian observatory
5 Humiliate
10 Showing unusual talent
14 River in central Switzerland
15 Russian country house
16 Person who lies
17 Animal hunted for food
18 Abalone
19 2nd Greek letter
20 Vigor
21 Leg joint
22 The largest asteroid
23 Growths in the upper throat
25 Glass ornament
27 Greek goddess of the dawn
28 Value of business done in a given time
32 Desolate
35 Operatic feature/bright region on Mars
36 Exclamation of surprise
37 Engrossed
38 Hire cars
39 Urn
40 Very skilled person
41 Ninth month of the Jewish calendar
42 4th Greek letter
43 Depth
45 Label
46 Public swimming pool
47 Of a light brown color
51 Fragment
54 Penzias' proof
55 Masc. pronoun
56 Alternative name for Pi Meson
57 Hidden
59 These radiation particles are electrons
60 Poker stake
61 Wild sheep of S Asia
62 State in the W United States
63 Nipple
64 Fine fur
65 Supernatural force

DOWN
1 10th Greek letter
2 Having ears
3 Saturn's edible ring?
4 Lock opener
5 2nd Apollo asteroid to be discovered
6 Uncovered
7 Peak
8 Fem. pronoun
9 Organ of hearing
10 A planet's reflectivity
11 Coffin stand
12 Overdue
13 Periods of history
21 An eccentric
22 Scene of first miracle
24 Trim
25 Prehistoric chisellike tool
26 Greek goddess of strife
28 A great place for a star party
29 South African river
30 The Orient
31 Moon of Saturn discovered in 1672
32 Small nail
33 Ornamental fabric
34 Fencing sword
35 Variable Star Fans
38 Bound
39 Russian space probes which visited Halley's comet
41 Cut
42 Broad valley
44 Object which orbits the sun
45 Small tube
47 Pertaining to mode
48 8th Greek letter
49 Largest moon of Saturn
50 City in Nebraska
51 Petty quarrel
52 Motion picture
53 Roster
54 Child's bed
57 Purulence
58 Period of history
59 Derelict



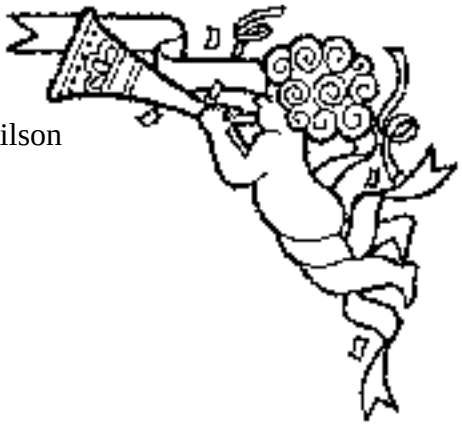
The Welcome Mat

The cherubs are in shock! They've had to use two, count 'em, two columns this month, we have so many new members! A loud and long round of applause, if you please, for our newest members...



Lucyna Cabaj
Bloomington, IL

Joe Kennedy
Bloomington, IL



Kim McRoberts-Wilson
Bloomington, IL

Jim Swindler
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!!