

The OBSERVER



The Newsletter of the Twin City Amateur Astronomers, Inc.

August 2001 Volume 26, Number 8

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The Nebraska Star Party -- A Review

— Brian Barling

THE NEBRASKA STAR party is held at Merritt Reservoir, located in a remote northern central part of the state. It is so remote that the nearest town is Valentine, which is about twenty-seven miles from Merritt. It is one of the darkest skies in the country for observing.

I left Bloomington-Normal on Saturday morning, and after a two day drive, arrived at Merritt Resort to check in.

As I pulled into the gravel parking lot, I could see a small store at one end of the

parking lot and next to it the resort and cabins. The resort included a restaurant and a bar, which had a view of the lake.

Next to the restaurant is a shop offering fishing equipment, t-shirts and camping supplies. Two vendors were selling telescopes, eyepieces, books and other observing supplies in front of the resort. While waiting for the resort to open, I met Sandy, who had arrived shortly before, and was camping at the observing site. After checking in, I drove

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discover new worlds



2001: a nebraska star party

**Back By Popular Demand...
Monthly Meetings @ the ISU Planetarium!!**

See p. 3 for details...

TCAA Calendar

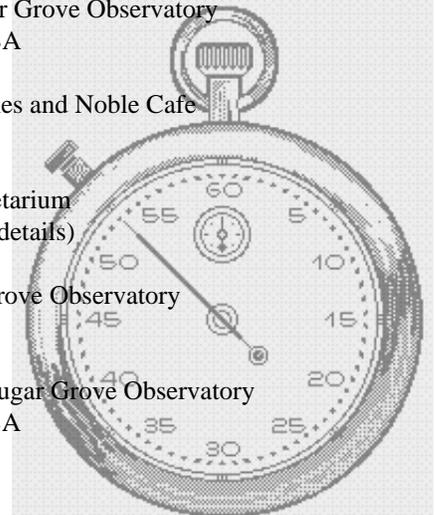
Saturday, 25 August, 8:30 - 10:30 PM, Sugar Grove Observatory
Public Observing Session. Coordinator: TBA

Monday, 3 September, 7:30 - 9:00 PM, Barnes and Noble Cafe
TCAA Reading Group. Selection: Parallax

Monday, 10 September, 7:00 PM, ISU Planetarium
TCAA Monthly Meeting (see p. 2 and 3 for details)

Saturday, 15 September, Sundown, Sugar Grove Observatory
Members Only Observing Session (MOOS)

Saturday, 22 September, 8:00 - 10:00 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.

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Articles, ads, etc., are due by the 1st weekend of each month. Items may be e-mailed to: mprogers@mail.millikin.edu, or jmemken@ilstu.edu

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

Club Notes

— Sandy McNamara

General Monthly Meeting

IT WAS agreed at the last Board of Directors Meeting that it would be nice if we could return to the practice of having a general monthly club meeting in town. Pending approval of the ISU Planetarium director, we will start holding these on the second Monday of each month at the ISU Planetarium beginning at 7:00 PM. For our September meeting, Sep 10, we are planning a fun review of the

evening sky and a presentation for beginners on the different types of telescopes available

(refractor, reflector, catadioptric). If you have a question about a new telescope you may have received, this would be a perfect opportunity to have it answered. All new members are especially encouraged to come to the gathering; the TCAA has several ongoing programs for beginners that you may not be aware of and I would like to organize some additional activities, but we need your presence to do this.

The monthly meeting is your opportunity to meet other members of the TCAA in an informal setting, keep up with current TCAA activities and plans, and help out with suggestions for ways to improve the club in general. Come and join in for an evening of fun and camaraderie – and we'll have munchies too! The white-domed ISU Planetarium is at the east end of Felmley Hall of Science on the corner of College Avenue and School Street in Normal. Free parking for evening events at the ISU Planetarium is available 300 paces NNE of the planetarium in Univer-

sity Parking Lot F-67,

New Member Information Packet

These WILL be available at the meeting September 10 (as they are at most scheduled club activities and at the SGO). If you have not received one, plan to attend so you can pick one up. The package contains information that might answer many questions you might have about the TCAA history, benefits, and activities as

well as several articles that would be helpful to beginners in various areas and complete information on all of the observing award pro-

grams. The information packets are free to all members, but are not routinely mailed due to their size and weight. Please don't be shy about introducing yourself as a new member at any TCAA activity and asking any officer to assist you in obtaining one.

SGO Update

The last piece of missing siding has been installed on the outside of the building. The entire outside of the building has also been re-stained along with the other buildings at the Sugar Grove Nature Center. The SGNC is preparing to install a walkway from the parking area to the observatory building. While this will be a vast improvement, the ground is currently very soft and uneven from the initial digging and preparation, so be careful when walking through the area after dark.

There have been many varied ideas from members on methods to improve the sta-

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Introducing (Again!!)

The TCAA Monthly Meeting

Where: ISU Planetarium

When: 2nd Monday of *each* month at 7 PM

What:

- Beginner's Corner
- How-To's and FAQs (Frequently Asked Questions)
- Observing Reports
- Business-y Stuff
- Munchies!

On the Road Again — Part II

— Jean Memken

AS PROMISED, here's the second installment of great places for amateur astronomers. As you recall from last month, I wrote about the Rose Science Center and Hayden Planetarium located in New York City. The day after I got back from New York with my family, I set out again, this time on my own, in the opposite direction. I had to go to a meeting in, of all places, Big Sky, Montana. If there could be a place more isolated and remote and such a direct contrast to the hustle of the Big Apple, it is definitely Big Sky. I traveled the 50 miles between Bozeman (where my plane landed) and my hotel at Big Sky, and I met exactly two cars the whole way, and their drivers must have been visitors like myself because they were driving like me, slowly and carefully through the hairpin and U-turns that take one up and down the mountain side to the Big Sky Resort area (located at about 10,000 feet above sea level). We were told the natives took that same road at about 65 miles per hour, which is actually the speed limit posted for most of it.

Naturally being at that elevation with hardly anyone else around and the nearest town over 50 miles away, you can just imagine what the night skies look like.

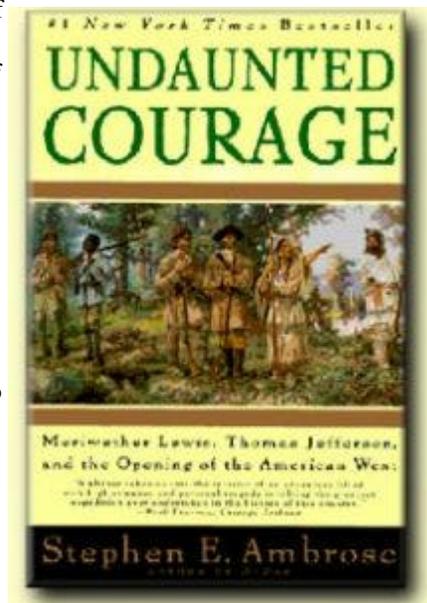
Well, maybe you can't if you are an urbanite like myself and get excited if you are able to see the Big Dipper or Orion overhead on a clear night. The skies out there are so dark and so clear that they almost don't look real. They look like the dome of a planetarium. I don't think I have ever seen so many stars in my entire life as I did when I looked out on the night skies of Big Sky, Montana.

Since coming back from Big Sky, I have been reading the book, *Undaunted Courage*, by Stephen Ambrose, which chronicles the Lewis and

Clark excursion that went right through the Bozeman Pass near Big Sky. As I was reading the book, I was struck by the number of times that Ambrose reported

Lewis would get out his observational equipment and chart the stars. However, given the beauty and clarity of the night sky, it would have had to have been an attractive way to spend an evening for Lewis as well as countless others who have come after him. Of course, Lewis and Clark had more than an amateur astronomer's interest in the night sky. They needed the stars to figure out

where they were as they worked on map-



continued on next page

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ping the Louisiana Territory from the Mississippi River to the Pacific coast. Their maps were amazingly accurate, partially due to their ability to navigate through the night sky. And the skies in Montana would be easy pretty easy to navigate. All the stars are right there, and there's no second-guessing as to what you are seeing when you look at the night sky.

Before I made the journey to Big Sky, I spent a day in Bozeman, and promptly dubbed it a "little big town". The population of Bozeman only about 7,000, but the town is situated in a large valley sur-



rounded by the Rocky Mountains, so there is plenty of room to "spread out". And that is exactly what the citizens, merchants and leaders of Bozeman did. I thought I would take a little jaunt downtown to see the sites and the map showed it to be about 5 blocks from my hotel. However, the hotel clerk informed me that would be about a 3-mile hike one-way. The real destination that I was interested in visiting was the Museum of the Rockies, which was on the other side of town, and so I didn't even bother finding out the distance. I jumped in my rental car and about 20 minutes later found myself at the museum, which is located on the campus of Montana State University.

The Museum of the Rockies is an anthropologist or historian's dream. It is a small museum as museums go, but it has wonderful exhibits on geology, dinosaurs (the first *Maiasaurus* was actually discovered at a dig not far from Bozeman), and the life of the pioneers and Native Americans in Montana. There is a recreation of a Montana homestead, animals included, and a whole wing devoted to the weaponry used by people throughout history. And then there is the planetarium. The Taylor Planetarium blends the science of astronomy with the art of theatre for an unforgettable experience. It was reminiscent of my Planetarium experience in New York City, but now I was sitting in a state of the art planetarium that was pretty much in the middle of nowhere.

The planetarium show I got to see was entitled, "Time Stalkers". It was a funny and fast-paced show featuring Detective Sam Stopwatch and his nameless, but sultry, female client, who were on a quest to find her

lost sense of time. We boarded Sam's time machine and went way back in time and then forward to the present to understand the astronomical basis of timekeeping. It was a great show, produced right at the planetarium, and it took advantage of all the latest computer technology to educate and entertain the audience.

If you ever make it out to Montana, don't just look up at the skies. Make time to visit the Museum of the Rockies and the Taylor planetarium. I know I could never compare myself to Lewis or Clark, but after visiting the museum and planetarium in Bozeman, I felt like I made a gem of a discovery as I blazed my own trail out West.

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bility of the telescope pier at Sugar Grove Observatory. A committee, chaired by Jim Baker, has been appointed to keep track of all of the submissions and organize them in one place. While Jim's email and phone number is listed at the front of this Observer, it would be preferable if you mail any information to him at 701 E Walnut, Bloomington IL. It is important that anyone with ideas for work on the pier be as specific as possible and supply whatever information they might have. We would like to know WHO might be available/qualified to do any suggested modification as well as WHAT type of materials might be required and any COST estimate or guess. Don't forget that, although the pier does need something done to improve some problems with flexure and vibration, it IS usable for most activities in its present condition. We have been utilizing the C14 for all public observing sessions as well as personal observations by SGO keyholders. Any modifications that are eventually done to the telescope pier must be both technically "do-able" without permanent harm to the observatory building as well as within the limited financial resources of the TCAA.

Skyline!

**The Official Voice of the ISU
Planetarium/TCAA**

438-5007

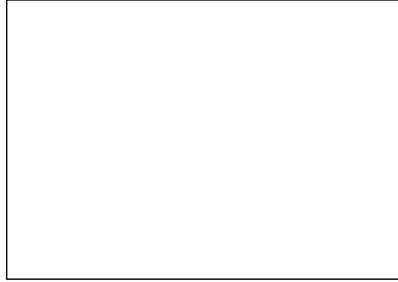
Letters to the Editor

— Observer Readers

Need to get something off your chest? Drop us a line!

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Bloomington, IL 61701-1474

or mprogers@mail.millikin.edu



August, 2001

HELLO, FELLOW IDA Member:
I am asking for your help again.
In February of 2000 I asked you to write to the Illinois Department of Transportation in Springfield, to urge Mr. Sunley to use only full cut-off light fixtures on all state-funded roadways.

If you wrote to Mr. Sunley, you probably received from him the same reply that I did, explaining why it is not practical nor cost-efficient to employ FCO's for roadway lighting. I was unconvinced by his arguments, and am even more doubtful now that so many states are adopting legislation designed to control light pollution.

I have recently heard from a lighting engineer that our letters caught Mr. Sunley's attention, and that Mr. Sunley is looking at the practicality (or lack of) of retrofitting current lights to make them effectively full cut-off. This same engineer urged another letter-writing campaign and said he thinks it really might make a difference. And he explained that if Illinois DOT adopts FCO lighting as their standard, then cities and utility companies may follow and adopt the same standard.

So please take a minute to either write your own letter, or to sign and send the one I have enclosed. With all of us making our thoughts known, we may enhance the starry nighttime skies of Illinois.

Thank you!

Bonnie Gerrit
Galena, IL

Mr. William Sunley
Deputy Director of IDOT
2300 S. Dirksen Parkway
Room 215
Springfield, IL 62764

Dear Mr. Sunley,

This letter follows up our February/March 2000 correspondence in which I asked you to use only full cut-off luminaires for state-funded roadways in Illinois.

I remain unconvinced that shining light upward and whiting out the visibility of the star-scape is justified for state-funded roadways. Many other people agree, including the International Dark Sky Association, of which I am a member. According to their June 2001 newsletter, the states of Arizona, New Mexico, Texas, Connecticut, Maine, and Colorado

now have some type of ordinance regulating light pollution. The New Hampshire Department of Transportation has promised to implement full cut-off lighting from now on. New outdoor lighting laws are under consideration in state legislatures in Connecticut, Massachusetts, Rhode Island, New Hampshire, New York, Iowa, Wyoming, Colorado, Maryland, Texas, and Virginia.

I am asking you to please re-consider your policy and to implement full cut-off lighting fixtures along state-funded roadways all throughout Illinois.

Sincerely,

Your Name Here!
Somewhere, IL



continued from page 1

to the hotel at Valentine. After dinner and a tour of Valentine, I left for the observing site.

The sky was partly cloudy with thunderstorm clouds in the distance, so I waited to see what the weather was going to be before setting up my telescope. I met Club members Bob Cuberly and Roy Lowry who were setting up their telescopes, and were camping at the observing site.

Shortly before dark, I set up my scope table and hooked up my NGC mini max computer that can direct the telescope to an NGC object or planet that is entered into the display. Weeks before the star party, I made a notebook of some of the Herschel 400 objects that I needed to find. Also, I either printed out a picture of what the object should look like in the eyepiece, using my plan-

etarium software or made a reference to the object on a page in an observing book. My first target was the Virgo cluster of galaxies in the constellation Virgo because Virgo was beginning to set just after dark, and needed to get as many objects as I could. Next on my list was Sagittarius Cygnus, and Leo. I planned to get mostly dim objects that were between

10th and 14th magnitude. The sky did not become totally dark until after eleven thirty. The sky was partly cloudy and it was beginning to cool off. The Milky Way could still be seen behind some of the thin clouds. It's beyond words how bright the Milky Way was and how many star clusters and nebula could be seen. About midnight lightning could be seen in the east, and it looked as if a storm was coming through, so I packed up my scope and

were near Messier objects that were easy to find naked eye. I found several Herschel objects that were on my list.

There were two clear nights of observing and two nights of partly cloudy skies. Cloudy evenings gave me the opportunity to meet other stargazers. Sandy and I talked to a retired couple that had a travel trailer near by, who had just come from the Colorado star party. They were from

Texas, and had been into astronomy for only two months. They had an eight-inch Next star telescope.

I spent most days fishing and saw Snake Falls which is just outside of Merritt resort. On my last day Bob, Roy, Sandy and I spent most of the day on a canoeing tour given by a local company on the



The Virgo Cluster (image by Randy Brewer, www.randybrewer.com)

headed back to the hotel. I did not get any objects the first night. My first full day was spent fishing along several spots along the lake. I didn't catch anything except a sunburn. The following evening was clear enough to do some observing. The milky way was even brighter than the night before. I found several objects on my list in Virgo and Sagittarius. Most

Niobrara river, outside of Valentine. There were enough people on the trip to more than fill up a school bus.

I left for home Friday morning, and plan to be back next year. This was well worth the trip. The Nebraska Star party can be found online at:

www.nebraskastarparty.org.

Board of Directors Meeting Minutes

— Michael P. Rogers

THE TCAA Board of Directors met at Coffee House on Wednesday, August 8th, and came to order at 6:11 PM. In attendance were Jim Baker, Susan Baker, Brian Barling, Sandy McNamara, Dan Miller, Michael Rogers, and Duane Yockey.

The first order of business was to consider the reinstatement of monthly, general club meetings. After a discussion of possible days -- Fridays and Saturdays were eliminated because the ISU Planetarium, our venue of choice, was booked -- it was decided that to hold the meetings at the ISU Planetarium on the second Monday of each month, starting at 7 PM. Sandy indicated that she would verify this time with Tom Willmitch [who has since indicated that it would work].

The format of the meeting was then contemplated. It was decided to start off with a business meeting at 7-7:30 PM, followed by a Beginner's Corner. This month's topic would be basic telescope taxonomy, as well as telescope-troubleshooting.

Michael volunteered to contact Shaukat to see if he'd be available for either the October or November meeting.

Next on the agenda was the formation of a committee to evaluate the myriad pier solutions that have been proposed. Viable solutions, it was decided, must meet the following criteria: they must not involve rebuilding the entire observatory, removing the pier, and must be financially and physically feasible. Jim Baker offered to serve as chair; ideas and suggestions should be sent to him.

The club has received several observing and/or presentation requests:

- 10 August, Arrowsmith Town Hall
- 11 August, Boy Scout troop at Centennial Park, Heyworth
- 15 September, Ecology Action Center Picnic at SGNC

- 21 September, Covell Town Hall
- 17 November, Trinity Lutheran School

The Bloomington Public Library presentation originally scheduled for 18 October has had to be changed, as our ultimate-insider at the BPL (and TCAA Librarian) Karen Moen was occupied that evening. The author volunteered to give a presentation on October 2nd or 30th, ("Messier Lives Upstairs, Duct-Taped to the Ceiling") the scheduling to be finalized after consulting with the author's spouse and Karen.

A question arose as to whether we should extend the public observing sessions, which have been remarkably popular this year, to twice a month. After much debate, it was decided to table the question until midwinter.

It was decided to hold an observing session in honor of the Perseids, on 11th August, at the SGNC. Susan offered to contact new members to invite them; Duane would provide her with a list of names. Since yours truly was going to be at Centennial Park, arrangements were made to ensure that critical restroom facilities would be accessible.

Next on the agenda was a discussion of mirror grinding. During Astronomy Day, Joseph Dehoff had volunteered to offer a class on mirror grinding, but we had not acted on it. Sandy offered to contact Joe on the subject. [Since the BOD meeting, Joe has indicated that he would be amenable to offering the class, and will see if he can find a suitable location in Bloomington].

One of my favorite topics, a membership drive, was discussed. It was decided to amend this to an awareness/visibility drive; Brian very courageously offered to distribute brochures. Sandy suggested that we wait until we have finalized the monthly meeting schedule, and then print a revised batch of brochures. Yours truly

will be doing a Kinko's run in the near future to make this so.

The question of sponsoring an award for best astronomy project at a science fair was discussed. It was unclear as to whether there *were* any local science fairs. Michael said that he would contact Jim Swindler on this.

The last official agenda item involved lobbying for lighting ordinances. Sandy said she would order the IDA (International Dark Sky Association's) presentation on the subject, and Duane said that he would talk to both mayors about the subject, to see how it could be done, or if indeed it would be feasible.

Jim noted that the 10" mirror is pitted, and needs to be realuminized. He offered to pay for it as a personal donation. He will contact Joseph Dehoff to get the name of a good aluminizer.

Finally, it was noted with sadness that Gene Sutton, a long time member, had passed away, and that a memorial was planned (the date was unknown at the time of writing).

The meeting adjourned at 8:01 PM.



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Starry Night: The Workshop

— Michael P. Rogers

FOR THE SECOND year in a row, Dan Miller, Jim Brown and I have offered a workshop at Millikin University, titled rather prosaically “Starry Night: The Workshop”, exclusively for Decatur elementary school teachers. The workshop consists of hands-on training with:

- Starry Night, a desktop planetarium now published by space.com;
- a Meade LX-200 8” Go-To telescope;
- an SBIG STV video camera/auto-guider

Thanks to a generous grant from the James Millikin Foundation, not only is the workshop totally free to participants, but they all receive a personal copy of *Starry Night Pro*, and the ability to check out the LX-200 and/or SBIG STV, for a week at a time, for class use.

Not that last year’s workshop was a failure, but we did learn from our mistakes: we expanded it this year to two nights, and had a sizable handout describing,

step-by-step, everything that we did during the session.

I don’t want to boast but... oh, who am I kidding, I want to take our evaluations and glue giant blow-ups of them on the Good Year Blimp. They were *that* good. Apparently elementary school teachers are among the most generous reviewers, but still....

The first night was an all-indoor session, spent working through the basics of *Starry Night*. One of the greatest challenges was to keep our explanations simple and jargon-free; our audience was interested in astronomy, but with one or two exceptions had no particular expertise in the area.

The second night consisted of another session with *Starry Night*, followed by a 2 hour observing session in sauna-like conditions.

Jim had provided several LX-200’s from his collection, as well as several smaller refractors. He also used his powers of persuasion on Millikin security, who dutifully turned off the football field lights so that we could at least see something.

The last workshop had convened at Friends’ Creek State Park, but the actual turnout was smaller than expected; by reconvening at the university, nobody had any excuse (and indeed we picked up a couple of interested family and faculty members, swelling our numbers to at least twenty).

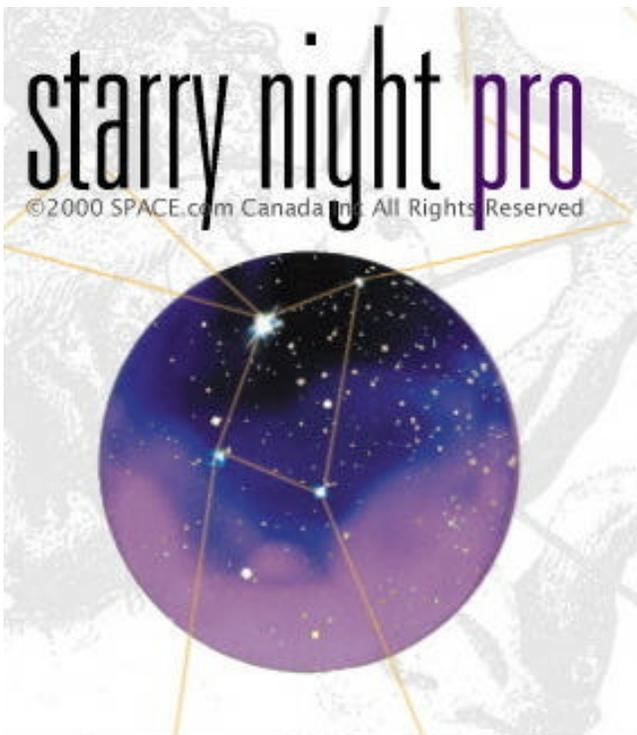
A Review of the SBIG STV

We acquired the LX-200 last year; this year, we upped the ante by acquiring an SBIG STV (through Software Bisque, an SBIG dealer perhaps better known as the publisher of *The Sky*). This device is a video camera, integrating digital CCD camera, auto-guider, and more, all rolled into one convenient, and conveniently-small, package (29.5 x 23.7 x 6.7 cm for the controller).

For those of you who are scratching your head over the last paragraph, let me try it again in English. SBIG, short for Santa Barbara Instruments Group, manufactures a number of CCD cameras, designed to take images of the dim and fuzzy objects that punctuate the night sky. A CCD camera has, at its heart, a tiny chip, comprised of a two-dimensional grid of light-sensitive pixels. This chip is able to count how many photons strike each pixel; the more photons, the brighter that particular region in the sky. Since the chip reduces the wonderful night sky to a series of discrete numbers, it is said to be “digital”.

A video camera has the same sort of chip at its heart; but it isn’t able to count photons over an extended period of time, and so it isn’t able to “see” faint objects. The term “integrating” means that a CCD camera accumulates photon counts over as long a period as you’d like.

An *auto-guider* can automatically control a telescope, to make sure that it stays locked on a particular star. Many telescopes have clock-drives, but they are not sufficiently accurate; since the invention of astrophotography, astronomers have had to manually make minute corrections in telescope position during long time exposures, to make sure that stars don’t drift and leave trails. An auto-guider removes the drudgery, by making the changes automatically. It requires a suit-



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able telescope, but fortunately the LX-200 fits the bill.

Most CCD cameras require a computer: you put the CCD camera head into the telescope, replacing the eyepiece, and then connect the CCD camera to the telescope via a serial port. One of the most attractive features of the STV is that it makes this unnecessary: you may capture images and view them immediately on an built-in LCD panel — no computer required. Optionally, you can route the video signal to an external monitor. The latter may seem like overkill, but *you* try and control 25 grade school students while one of them is struggling to locate some fuzzy object in the eyepiece. The life of an elementary school teacher is not easy...

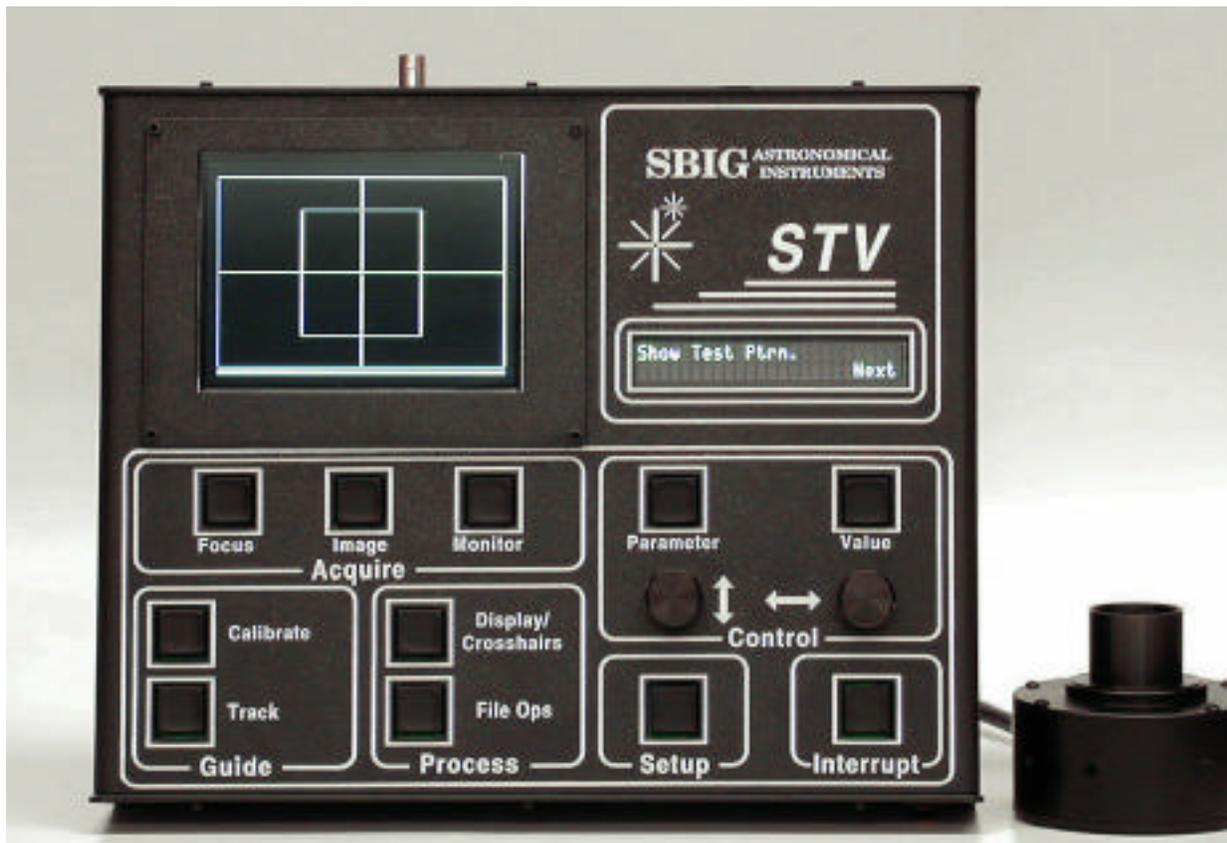
Speaking of “not easy” leads us into a discussion of focusing. Suffice it to say that we are still struggling to master this

arcane art. Stars do not focus into precise pin-points, but instead, with their light covering multiple pixels, end up as splotchy circles. Deciding when the splotchy circle has achieved its minimum size, and is in focus, is no easy matter; and focusing on a nebulous object is even more problematic.

After much experimentation, we thought we had a solution: focus on a star, then use the LX-200 to slew to the object we wish to image. Unfortunately, the STV’s field of view is incredibly small, requiring we place the object *precisely* in the center of its CCD chip. The LX-200 is a marvel of engineering, and is sufficiently accurate to get the object in the eyepiece, but not always in the center. Apart from randomly slewing about the heavens and hoping for a stroke of luck, our only option was to take out the CCD camera, replace it with an eyepiece, then center the object. But this requires refocusing

for the eyepiece need to refocus to look for the object -- a vicious circle.

So, having read this, you may be asking, what on earth were we thinking of, unleashing this monster on elementary school teachers?? First, we did not emphasize this equipment; I gave more space to it in this column because I know that several of you may be interested in this. But, in defense of “CCD” and “novice” in the same paragraph, for bright objects, the STV is ideal; and as the numerous CCD images that one finds on the web and in print make manifest, it *is* possible to get stunning results with this device, if one is patient. We expect to get better over time, and we think that the workshop participants will, too.



Treasurer's Report — June & July 2001

— Duane A. Yockey, Treasurer

OPERATING FUND BALANCE – May 31, 2001 -
\$1,463.29

Income

Sue Fancher (dues) - \$ 25.00
Kathryn Kerr & Sarah Palmer (dues) \$ 25.00
Wallace & Nguyet Strow (renewal) \$ 25.00
Robert Poorman (renewal) - \$ 15.00

Expenses

Astronomical League \$199.00

OPERATING FUND BALANCE – June 30, 2001 -
\$1,354.29

OBSERVATORY FUND BALANCE – May 31, 2001 -
\$ 120.96

Income

Sandy McNamara (key deposit) \$ 10.00

Expenses

None

OBSERVATORY FUND BALANCE – June 30, 2001 -
\$ 130.96

TOTAL TCAA FUNDS – June 30, 2001 -
\$1,485.25

OPERATING FUND BALANCE – June 30, 2001 -
\$1,354.29

Income

Randy & Megan Ozdyck (dues) - \$ 25.00
Shaukat & Farida Goderya (dues) - \$ 25.00
Wally Mead (dues) - \$ 25.00
Charlie Koerner (renewal) - \$ 25.00

Expenses

None

OPERATING FUND BALANCE – July 31, 2001 -
\$1,454.29

OBSERVATORY FUND BALANCE – June 30, 2001 -
\$ 130.96

Income

Interest (April, May & June) \$ 0.69

Expenses

None

OBSERVATORY FUND BALANCE – July 31, 2001 -
\$ 131.65

TOTAL TCAA FUNDS – July 31, 2001 -
\$1,585.94

Sugar Grove Observatory

Listing of Official Keyholders (Paid \$10 deposit)

Jim Swindler (April 2001)
Duane Yockey (April 2001)
Sandy McNamara (June 2001)

The Observer Crossword

—Observer Staff

ACROSS

- 1 2nd Greek letter
- 5 Scab
- 9 Orc
- 12 Pare
- 13 Lair
- 14 Are
- 15 Darn
- 16 The constellation in which Canopus is located
- 17 Lac
- 18 Ayes
- 20 The suns most distant planet
- 22 Ladens
- 25 Reader
- 26 Asset
- 27 Rebs
- 28 Anglo-Australian Observatory, for short
- 29 Bud
- 30 Tam
- 33 A type of star cluster
- 35 Aural
- 37 Plains
- 40 Barged
- 41 Notes
- 42 Char
- 43 Ariane's developer (abbr)
- 44 Penzias' proof
- 46 Disk on which 84% of star's light is concentrated
- 50 Pas
- 51 A religious eyepiece?
- 52 Tore
- 53 Tem
- 54 Deli
- 55 Wane

1	2	3	4		5	6	7	8		9	10	11
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53				54					55			

DOWN

- 1 Ms. Streisand's favorite unit of atmospheric pressure
- 2 Ape
- 3 Net
- 4 Ranted
- 5 Scars
- 6 Disk on which 84% of star's light is concentrated
- 7 Gab
- 8 Lopers
- 9 Curer
- 10 Oater
- 11 Carlo
- 19 Sad
- 21 Alb
- 22 Ariane's developer (abbr)
- 23 Ale
- 24 Anglo-Australian Observatory, for short
- 25 Bed
- 27 Hub of the solar system
- 29 Eld
- 30 Gum
- 31 Ear
- 32 Art
- 33 Eon
- 34 The unit of gas pressure
- 35 Cal

- 36 aka Epsilon Canis Majoris
- 37 Water vapour
- 38 Pesos
- 39 Paint
- 40 Brede
- 42 A religious eyepiece?
- 45 Bio
- 47 An atom bought with a Mastercard?
- 48 Ret
- 49 Wye

A	N	E	W	A	N	E	W	A	N	E	W	A	N	E	W
S	P	A	B	E	R	O	T	S	P	A	B	E	R	O	T
E	S	A	C	O	B	E	A	I	R	E	S	A	C	O	B
T	O	N	E	S	A	R	C	H	T	O	N	E	S	A	R
R	P	I	N	A	L	E	A	D	G	E	R	R	P	I	N
O	P	E	N	L	A	U	R	A	O	P	E	N	L	A	U
A	V	A	T	S	E	R	E	M	A	V	A	T	S	E	R
E	L	A	N	D	S	D	B	A	R	E	R	E	L	A	N
O	L	T	O	P	L	A	S	A	R	O	P	L	A	S	A
R	A	N	O	A	R	G	O	C	A	L	R	A	N	O	A
A	P	E	R	R	I	A	L	E	R	A	A	P	E	R	R
R	O	C	A	B	S	C	A	V	A	R	O	C	A	B	S

The Welcome Mat

Our cherubs are digitally-thrilled, and planning to release an MP3 Song of Welcome, in honor of our first member to pay their dues on-line! A warm August welcome to...



Joseph McCarron
Bloomington, IL



The OBSERVER

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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!!