

THE Eyepiece



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A Super What???

by Anthony J. Kroes

A 'supernumerary rainbow' – at least that's what we eventually found out it was called. But that's the end of the story – let's go back to the beginning.

It was Saturday, May 28th and one of the usual spring storm cells had just passed over us with a nice shower. It was heading East, with clear skies and



a moderately low sun to the West behind it. Figuring it was a good chance to see a rainbow, Tara and I headed out the back door. WOW! What a sight! We were greeted by a stunning display of optical wizardry. It was one of the brightest rainbows I can ever remember seeing – almost fluorescent. In addition to that, it was perfectly formed and visible down to the horizon on both ends (does that mean two pots of gold?).

As if that wasn't enough, there was also a second rainbow above it. While not rare, this feature, caused by the refraction of light inside the drops of rain, doesn't appear with every rainbow. The interesting detail about these is that their colors are reversed from the main or 'primary' rainbow. We had seen double rainbows quite a few times in past years, so the frosting on this cake was a new feature neither of us had ever spotted before. Under the primary rainbow, where the color of the bow fades from blue to violet, was a series of additional violet bands! There were 3 or 4 of the extra bands, each thinner and more faint than the last. It was spectacular!

I ran inside to get the camera, but by the time I returned the extra bands were gone, the double was almost invisible, and the center of the primary bow was greatly faded. We took a few shots on 35mm as it continued to dim, but never caught the full glory on film.

Some research on the Internet later revealed that we had seen a 'supernumerary rainbow'. The extra bands underneath can vary in size and quantity, but are caused by light passing through a quantity of raindrops that are exactly the same size as each other. The drops must be a specific size (.7 mm) and the slightest variation in drop size (less than 8%) can cancel the effect, so it is not seen often. Simple optical refraction is not enough to explain this feature. One must account for the wave nature of light as it is actually an interference pattern!

If anyone saw the same display, or have ever seen or photographed anything similar, please let us know! We will publish your stories and images here.

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NPMAS Club Loaner Telescopes

NPMAS members may use, free of charge, for a one month, one of the two club telescopes available. For more details, please contact Gerry Kocken, *Properties Chair*, at 920-336-8594.



NPMAS is a proud member of the

Night Sky Network

"Astronomy clubs bringing the wonders
of the universe to the public"

Member Society



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Meetings, Events & Star Parties

June 2-5

Wisconsin Observer's Weekend
Hartman Creek State Park

June 6

New Moon

June 7

DPAS Monthly Meeting

June 8

NPMAS Monthly Meeting

June 10-11

Parmentier Observing Weekend

June 13

Pluto at Opposition

June 14

First Quarter Moon

June 15

NEWSTAR Monthly Meeting

June 21

Summer Solstice

June 22

Full Moon

June 26

Charles Messier's Birthday
275 Years Ago

June 28

Last Quarter Moon

Looking Ahead:

July 8-9

NPMAS/NEWSTAR Parmentier
Observing Weekend & NPMAS
Club Picnic

August 5-7

Northwoods Starfest
Chippewa Falls, WI

Aperture Fever

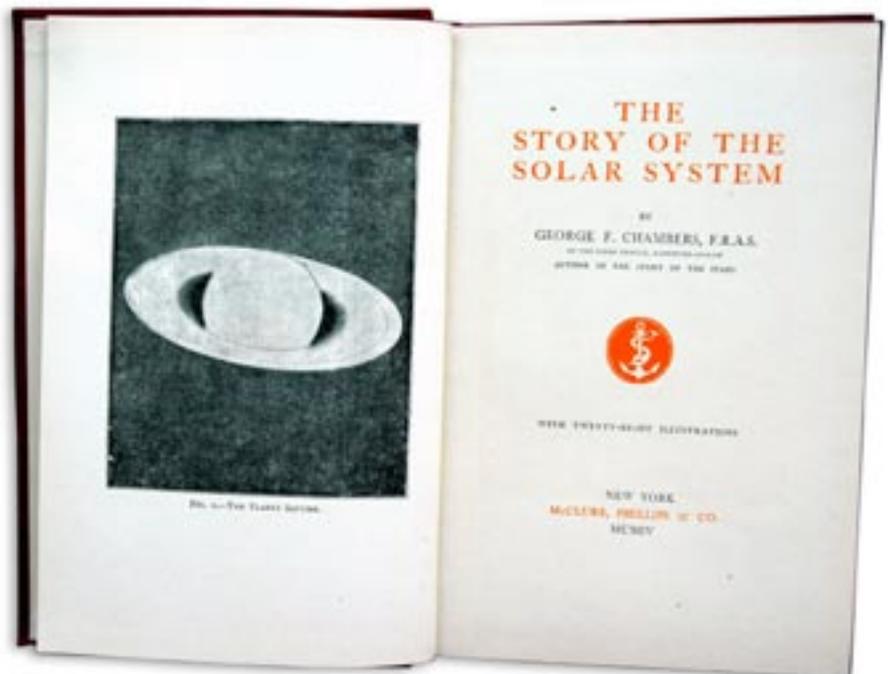
by Ed Smith

In the last Reflector (???) I read that Sir Patrick Moore was inspired to study astronomy by reading "The Story of the Solar Sytem" written by George F. Chambers in 1895. Well, that sounded like a classic I had to read. I found one via the Internet and it just came today. It was printed in 1904, and is in darn near mint condition.

From his preface it sounds like he would heap scorn on the fellows with severe aperture fever:

"I should deal with all these objects rather from a descriptive and practical than from a speculative or essay point of view, and with special reference to the convenience and opportunities of person possessing, or having access to, what may be called popular telescopes - telescopes say of from two to four inches of aperture, and costing any sum between 10 pounds and 50 pounds. There is much pleasure and profit to be got out of telescopes of this type always presuming that they are used by persons possessed of patience and perseverance. It is a very great mistake, though and extremely common one, to suppose that unless a man can command a big telescope he can do no useful work and derive no pleasure from his work. To all such croakers I always point as a moral the achievements of Hermann Goldschmidt, who from an attic window at Fontenay-aux-Rose near Paris, with a telescope of only 2 ½ inches aperture, discovered no fewer than 14 minor planets."

– George F. Chambers, The Story of the Solar System, 1895



Planet Watch For June

by Wayne E. Kuhn



Mercury is in superior conjunction on June 3. It will rise in the west-northwest evening twilight in the second half of the month. At that time it will shine at magnitude -0.5 and is $5.9''$ in apparent size. Mercury is in conjunction with Saturn on June 26 and with Venus on June 27. The separation between Mercury and Venus will be smaller than it has been since 1990.

Venus slightly improves its visibility as it emerges in the west-northwest at evening twilight. At the end of June it will set about 1.5 hours after the Sun. It shines at magnitude -3.8 and is $10.4''$ in apparent size. Venus is in conjunction with Saturn on June 25 and with Mercury on June 27.

Earth's Moon: New Moon is at 4:55 PM CDT on the 6th. Moon reaches apogee (251,970 miles from Earth) on the 11th at 1:00 AM CDT. First Quarter Moon is on the 14th at 8:22 PM CDT. Full Moon is on the 21st at 11:14 PM CDT. Moon reaches perigee (223,489 miles from Earth), on the 23rd at 8:00 AM CDT. Last Quarter Moon is on the 28th at 1:23 PM CDT.

Mars moves to Pices this month and rises about 3.5 hours before the Sun. It is about 10 degrees high in the east-southeast at the beginning of morning twilight. Mars will be in opposition later this year, which is the best time to observe it. It shines at magnitude 0.2 and is $8.3''$ in apparent size.

Jupiter is in Virgo, stands about 25 degrees high in the west-southwest at the end of evening twilight and sets around 1:00 AM in the west. It shines at magnitude -2.2 and is $39.0''$ in apparent size.

Saturn is in Gemini but moves to Cancer at the end of the month. It is rapidly sinking in the glare of evening twilight in the west-northwest and will be lost from sight by month's end. It shines at magnitude 0.2 and is $16.7''$ in apparent size. During the first quarter of 2005, the tilt of the rings increases slightly from 22.5 degrees to 24 degrees. It will then decrease to 17.4 degrees by mid-October. Saturn is in conjunction with Venus on June 25 and with Mercury on June 26.

Uranus is in the constellation Aquarius this month and rises about 1:00 AM. It shines at magnitude 5.9 and is $3.4''$ in apparent size.

Neptune is in the constellation Capricorn. It dimly shines at magnitude 7.9 and is $2.2''$ in apparent size.

Pluto is in the constellation Serpens Cauda and is at opposition on June 14, thus making it the best time to try and find it. It shines at magnitude 13.8 and is $0.1''$ in size.

Fire In The Sky

by Steve Wicker

On Friday April 15, my wife and I went to a friend's house and set up our telescope. We were just going to show our friends the moon, Jupiter, Saturn, and maybe a couple double stars. At about 7:40 pm, my wife said "Hey, isn't that Jupiter?" I looked and saw a white disk in the Northwest and said "yeah, I think it is, let me get an eyepiece." I put in my 32mm Konig (about 60x) and moved the scope to the object. What I saw amazed us all. At first I saw what looked like a bright white disc with two darker dots inside. It sat in one spot for 20 minutes or so. While looking at it trying to figure out what it was, it suddenly exploded!

It sent sparks in every direction, and there were at least 20 pieces which quickly burned up. There were a few larger pieces that floated East and seemed to glow orange and white as if on fire. We kept taking turns looking at the falling debris until we lost them in the trees. I have never seen anything like that before – it was pretty strange to say the least!

I thought maybe it was fireworks, but it sat in one spot for so long that couldn't have been it. I also thought it was a weather balloon, but why would it explode, and where did all the debris come from? With no reference, it was impossible to tell how big it was or how far away. My wife and friend were looking at it naked eye when I saw it explode in the eyepiece, but all they saw was that it disappeared, and then there was a gray cloud. It was about 45 degrees up from the horizon, and about 65 degrees Northeast.

Editor's Note: Coincidentally (???), late on Friday, April 15th, NASA has a slight 'mishap' with its DART spacecraft, a semiautomated satellite repair craft. It was in a testing run, approaching a military communications satellite when it unexpectedly ran out of fuel and may have actually impacted the target. Initial reports said that the collision avoidance feature destroyed the DART before that happened, but later reports say nothing of this. Stories on Space.com now say that the two craft did indeed collide, but that both were working properly afterwards, and that the DART retired itself into a safe orbit for reentry in the next 25 years or so. Hmmm, sounds a bit strange to me!

Building a 16" AstroSystems TeleKit-Part II

by Dick Francini

I'm sitting here looking at a huge pile of 420 parts, where do I start? I arbitrarily choose to start with the mirror cell, as it looked like an interesting place to start. There were actually a couple of fairly decent reasons to start here; it uses more parts than any other portion of the telescope, so when I'm done with this part I'll feel like I have made real progress (the pile will be smaller). It will also give me practice with wood finishing, as one side gets blackened with Ultra Flat Black spray paint and one side is finished with polyurethane. I'm told that many people actually start with the mirror cell, so maybe it's not such a bad choice.

The mirror cell design is very interesting with numerous parts fitting into a small compact area. The cell uses a sling system to support the weight of the mirror and has an 18 point flotation system that supports the mirror.

The picture on this page shows the finished mirror cell in the foreground and the partially finished upper cage in the background. In the picture you can see the sling and the 6 black triangles with a support pad on each corner; this is the 18 flotation system. You might be able to pick out three posts with larger gray carpet pads attached to their tops, this is the "transportation system". If you back out the collimation bolts the mirror will end up sitting on these three posts. This keeps the mirror from bouncing around in the cell during transportation. A nice added feature you don't see on other dobs. The cell also has a cooling fan built in, along with two rechargeable



batteries (the two dark rectangular objects at two corners). The batteries are fairly heavy and are part of the counterweight system that balances the scope. The board that the mirror cell is built on is also part of the counter weight system; it is 1 1/4" thick and is quite heavy. The completed cell will fit into the bottom of the mirror box (when I get it done), creating an interesting fold down "tailgate" that allows you easy access to the mirror. Construction went smoothly, and I brought the finished mirror cell to a club meeting a few months ago for show and tell. Some of you saw it at that time and heard my brief description of the TeleKit. Another club member took a particular interest in the TeleKit and has since ordered one of his own. That member is Al Lawrence, who is looking to build a scope around Ron's old 20" mirror. Soon we will have two AstroSystems TeleKits in the club.

I next moved on to the assembly of the upper cage. Here I had my first (and hopefully only problem). I assembled and finished the upper cage, but when I went to put the laminate light baffle into the cage, it did not fit. What is the problem here? I hoped that maybe I had the wrong size laminate and correct size cage. I pulled out the secondary spider and tested it to see if it fit; much to my surprise it did not fit either. We have a real problem here, it appears that the cage is too small; which I confirmed by measuring it. I called AstroSystems; once we did a few more measurements we confirmed the worst, I had just wasted all this time and effort on the wrong sized upper cage. They were very apologetic and rushed out the correct parts. It seems I got a cage for a 15" scope. They sent me a gift certificate to ease my pain and suffering. If anyone is building a 15" (or 14") scope and needs a mostly completed upper cage, come see me, I'll sell it cheap! Don't take this problem as a reason to discount either the TeleKit or AstroSystems, accidents do happen. They handled the situation quickly and professionally. The upper cage, seen in two of the pictures on page 5, is the 15" cage. Note on the picture

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Building a 16" AstroSystems TeleKit - contnued

showing the more completed cage, the innovative filter slider, it is the brown rectangular box with the AstroSystems logo on it. The focuser fits on top of the filter slide and extends through the hole. You can switch from one filter to another by just turning the knob. The focuser is first rate in quality and is "low profile" to allow for the largest possible fully illuminated field. In other words, maximize the brightness of the image you see through the eyepiece. The secondary has four collimation adjustment screws instead of the three that most scopes use. I'll tell you which I like best after using this scope for awhile.

A quick note on overall construction, pieces are cut very accurately. Holes are pre-drilled and are also very accurate. In only a few cases do you need to drill any holes at all, and these are ones they can't pre-drill because they are giving you some building options. An example is the placement of the focuser in the upper cage. You can determine what angle you prefer the focuser to be at for optimal viewing comfort. Wood pieces go together with slow drying epoxy, so you have time to orient them properly before they dry. Epoxy forms an unbreakable bond when dry, but is very messy to work with. No matter how careful you are, you end up getting epoxy in places where it should not be. Thank goodness acetone gets the epoxy off all of these unwanted places. The kit is so complete that you actually get rubber gloves, stir sticks to mix the goop (you mix two different components to get your epoxy), little brushes to apply the goop, and plastic drop cloths to try and keep from getting the goop on everything else.



Once the upper cage and mirror cell were done I moved on to the ground board. This is the start of extensive wood finishing work (sanding and finishing with polyurethane). All the remaining parts require a significant amount of time be devoted to finishing. There are a couple of interesting and innovative things to point out on the ground board. Most dobs move in the azimuth direction (side to side) on Teflon pads sliding across a piece of laminate, this telescope substitutes bearings for the Teflon pads and adds a "break" to control the tension. The break adds or subtracts pressure to enable you to get just the right amount of tension in this bearing. I don't know of any dob that has this feature. This was probably the most confusing part of the assembly, but only because I was not familiar with this feature.

I'll save the construction of the "boxes" until the next installment. You can see one of the boxes in the picture, it is the rocker box. It is glued and then held in place by clamps for about 24 hours (or more if you have the time). In the picture with the rocker box you can also see the upper cage clamped together. At this point of construction I had eleven clamps in use at one time (and could have used more)! Special thanks to Gerry Kocken and Wayne Kuhn for letting me borrow these clamps.

Let me cover one more area before concluding part II, mirror ordering. I mentioned in part I that I chose Pegasus Optics (John Hall) to make my mirror and the reasons why I picked him. I ordered the mirror in early January in hopes of coordinating the completion of the TeleKit with the arrival of the mirror. I have heard some real horror stories in regard to the length of lead times for top quality mirrors, thus I had no idea what to expect. Pegasus had blanks already on hand for 16" mirrors, so I was expecting I might see the completed mirror in late April or early May. I just got the call last week that the mirror was completed and ready to go to the coater. I should get my completed mirror in late May, 4 1/2 months is excellent delivery time for larger mirrors. I'm super excited about how the mirror turned out, it sounds like Mr. Hall ground a great one for me. The numbers for those of you who know about mirror specifications came in at, 1/16 wave p-v, 1/49 RMS, and .98 Strehl ratio. I can't wait to use it! No doubt I'll have to live through a prolonged period of cloudy weather which will start the moment the scope is ready for first light.

Next month – Remaining construction!

Astronomy Photo of the Month



Gary Baier took this image of the Northern sky over a couple of old farm silos near Pulaski during the Kroes Observing Weekend in November 2004.

He used a Pentax K1000 manual camera on a tripod to capture the distinctive 'star trails' around Polaris as the Earth turned during exposure. Film used was Fuji 800.

NPMAS New Members

We introduced Jim Elbe last month, he found out about the club through his wife, who volunteers at the museum. He is 52 and has been interested in astronomy since he was 10.

Jim is a lifelong Green Bay resident, and lives here with his wife, Mary. They have 3 children - 2 sons in college at UW Madison, and one daughter living in Washington DC. Here are some details about his kit:

10x50 Binoculars
100mm F6 Refractor equatorial mount
127mm MCT equatorial mount
12 inch Dob

Welcome to the club, Jim!

We also introduced Merrill Milson last month also. Wayne got hold of him by email and here is what he had to say:

"Thank you for welcoming my girlfriend, Diane, and me into the NPMAS! Diane and I live in Green Bay; she is a nurse and I am an insurance broker. I found about the NPMAS from a business associate of mine, Christopher Schroeder; who recently sold me an old telescope of his. I have always been interested in astronomy but I haven't ever owned a decent telescope before buying Christopher's. It's just a beginner telescope and Diane and I are both novice astronomers. I thought that the best way to learn more about using our new telescope and learn more about astronomy, which we both find fascinating, was to join NPMAS. We look forward to attending upcoming meetings and functions and seeing what the club's all about. It sure sounds like it's very interesting and fun. I look forward to meeting you, as well as all the other NPMAS members very soon!

Merrill"

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Messier Marathon Mike Monfils

Astronomy Day Amy Hannon-Drew
Lynn Ward

Club Picnic Katrina DeWitt

October Field Trip Katrina DeWitt
Ty Westbrook

NPMAS Observing Sites

NPMAS members have access to three observing sites located on private land and belonging to members of our club.

Parmentier Observatory — largest private observatory in WI housing a 30" classical Cassegrain. Members may view through the 30" or bring their own scopes and set up in the field below.

Observatory Number: 920-845-5626

Ron Parmentier Home: 920-336-5878

Crivitz Observing — private residence of Dave & Carol Jorgenson. Located in the Northwoods of Wisconsin on 100 acres of land, this site offers some of the darkest skies around. The field is equipped with electricity and a cabin is available for use. Call ahead to make arrangements.

Dave & Carol Jorgenson Home: 715-757-3296

Cedar Drive Observatory — private residence of Tony Kroes and Tara Adsit. Located in Pulaski on 10 acres of land. Call ahead to make arrangements.

Tony Kroes Home: 920-822-4959

June NPMAS Meeting

June 8, 2005

Member Speaker

All members bring
your toys for
'Gadget Night'

Telescope of the Month:
Ray Nancoz, Dobsonian

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June 2005

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
				Wisconsin Observer's Weekend		
5	6 New Moon	7 DPAS General Meeting	8  Meeting	9	10	11
					Parmentier Observing Weekend	
12	13 Pluto at Opposition	14 First Quarter Moon	15 NEWSTAR Monthly Meeting	16	17	18
19	20	21 Summer Solstice	22 Full Moon	23	24	25
26 Charles Messier's Birthday 275 years ago	27	28 Last Quarter Moon	29	30		