Saguaro Astronomy Club

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SACNEWS

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Comet Austin An Underrated Spectacle

by Tom Polakis

Sky & Telescope magazine, February 1990: "Not since the discovery of Comet West in 1975 has a new find held such promise for observers." Thus, Rodney Austin's discovery of 1989c_1 was announced to the amateur astronomical community. And who could blame them for their level of optimism? The comet was already a target for a 6-inch scope at a distance of 230 million miles from the Sun upon its discovery in December. The orbital path was going to place it in our backyards by April. Would this be the comet of the decade? Would you believe ... year? So it didn't cast shadows or display a 45 degree naked-eye tail. Still it was a fine comet, and like Halley or Kohutek, very much worth observing if viewed with the right perspective.

As Comet 1989c_1 headed inbound, astronomers started to realize that this was not going to be the most spectacular comet. Measurements in March revealed a gas-to-dust ratio three times higher than of P/Halley at the same distance from the Sun. This was the first indication that the tail was not going to light up the sky as previous dusty comets such as West had done. Still this highly gaseous nature promised to make it very colorful with a long, thin ion tail.

What began as a faint coma with a diffuse fan in February shaped up very nicely by late April. Set up on the morning of April 20 at Vekol Road, Pierre Schwaar and I watched it rise in the Northeast, at the edge of the Phoenix sky glow. We both marveled at a brilliant blue-green head, resembling a bright planetary nebula. The tail was only several arcminutes wide but nearly 2 degrees long in the 13". At magnitude 5, it was very similar to the recent Comet Brorsen-Metcalf. On April 23, I could trace the tail to $2\frac{1}{2}$ degrees from New River. It had developed a slightly diverging appearance well away from the nucleus. The tail could be seen naked eye, with some difficulty, and the nucleus compared favorably will nearby M31's nucleus. The 28th of April provided the best view yet! The nucleus still has its beautiful blue-green color with the tail radiating away as three narrow streaks with a background glow. Rocking the tube of the 8" $f/4$ showed the extent of the tail to be two fields of view, or 4 degrees. The integrated magnitude was between 4 and 5 and the comet appeared to be peaking in brightness.

By May 26, during the Riverside Telescope Makers Conference, Comet Austin was streaking outbound, moving at over 4 degrees per day relative to the Earth. In the early morning hours, Getty Rattley and myself watched this tailless blob race against the background stars of Aquila. The comet was very large, perhaps as much as 1/3 degree in diameter, but showed very little central brightening. Most notable was its motion, carrying it visibly by a bright field star at 75X in only ten minutes.

streaking ...at over 4 degrees per day

I had the good fortune to be able to follow it through Scorpius near the zenith in mid-June from Australia. Although it had faded to 9th magnitude, it was fascinating to watch its aspect change on successive nights. The tail would be obvious at 1/2 degree length in an 8-inch on night and nonexistent the next. Most entertaining was watching Rick Rotramel, intent on finding it at the zenith with Paul Tierney's 18" $f/6$ Dobsonian; nine feet off the ground twisting and turning at Surrier truss members. Rick's 8" scope later gave an excellent view from a darker site.

Unfortunately, given the excellent job of coverage prior to the comet's arrival, the magazines have chosen to almost ignore Comet Austin after what they must consider a big letdown. *Astronomy* has printed some very good astrophotographs, notably by SAC member Chris Schur, along with some other not-so-good ASA 25,000 ones, while *Sky & Telescope* has barely done this. Lacking are the observer's reports for what must have been a very widely viewed comet. Those of us who did spend a lot of time with Comet Austin at least that like Comet Bradfield (1987), Comet Liller (1988), and Comet Brorsen-Metcalf (1989), this comet has left plenty of pleasing images in our minds.

Comet Comments
by Don Machholz

Four comets have been recovered recently, while one new comet has been discovered. Meanwhile, Comet Austin, a small comet which quickly expended much of its mass as it was still approaching the sun, has faded in our evening sky. But Comet Levy and Periodic Comets Encke and Honda-Mrkos-Pajdusakova continue to brighten. Comet Levy passes through opposition and into our evening southern sky, while Comets Encke and "H-M-P" move rapidly into our morning twilight sky.

Comet			**Levy**			**(1990c)**
Date	RA-1950-Dec		RA-2000-Dec		Elong Sky	Mag
07–23	23h47.7m	+29°12'	23h50.3m	+29°29'	107° M	7.3
07–28	23h37.0m	+28°33'	23h39.5m	+28°50'	114° M	6.9
08–02	23h21.7m	+27°22'	23h24.2m	+27°39'	121° M	6.5
08–07	23h00.0m	+25°18'	23h02.4m	+25°34'	130° M	6.0
08–12	22h29.1m	+21°39'	22h31.5m	+21°55'	140° M	5.4
08–17	21h45.8m	+15°21'	21h48.2m	+15°35'	151° M	4.9
08–22	20h48.4m	+05°16'	20h50.9m	+05°27'	155° M	4.4
08–27	19h41.1m	−07°38'	19h43.7m	−07°31'	141° E	4.2
09–01	18h35.1m	−19°17'	18h38.0m	−19°14'	121° E	4.2
09–06	17h40.3m	−27°08'	17h43.5m	−27°09'	103° E	4.5
09–11	16h59.0m	−31°48'	17h02.3m	−31°53'	90° E	4.7

Periodic Comet Peters-Hartley (1990d): Robert McNaught of Siding Spring Observatory in Australia recovered this comet on May 26 at magnitude 13. It's eight-year orbital period brought it closest to the sun (1.63 AU) on June 23 and its not expected to get any brighter.

Periodic Comet Wolf-Harrington (1990e): Jim Scotti used a 36" telescope at Kitt Peak to recover this comet on June 14. It was then magnitude 19, and is expected to become no brighter than magnitude 14 later this year.

Periodic Comet Honda-Mrkos-Pajdusakova (1990f): Jim Scotti also recovered this comet, on June 17. It will be closest the sun on Sept. 12 at 0.54 AU, in late July it passes only 30 million miles from earth. Positions are listed below, this comet may appear fainter than the estimates suggest.

Periodic	**Comet**		**Honda-Mrkos-Pajdusakova**			
Date	RA-1950-Dec		RA-2000-Dec		Elong Sky	Mag
07–23	01h30.4m	−01°53'	01h32.9m	−01°37'	99° M	9.6
07–28	02h32.3m	+02°37'	02h34.9m	+02°50'	88° M	9.1
08–02	03h43.5m	+07°30'	03h46.2m	+07°40'	74° M	8.7
08–07	04h54.1m	+11°33'	04h56.9m	+11°38'	61° M	8.5
08–12	05h54.6m	+14°08'	05h57.5m	+14°09'	51° M	8.4
08–17	06h42.7m	+15°30'	06h45.6m	+15°27'	44° M	8.4
08–22	07h20.7m	+16°05'	07h23.6m	+16°00'	39° M	8.4
08–27	07h51.9m	+16°13'	07h54.7m	+16°05'	36° M	8.4
09–01	08h18.9m	+16°01'	08h21.7m	+15°51'	35° M	8.4
09–06	08h43.8m	+15°32'	08h46.6m	+15°21'	34° M	8.4
09–11	09h07.8m	+14°46'	09h10.5m	+14°34'	33° M	8.6

Comet McNaught-Hughes (1990g): This comet was discovered by Robert McNaught from an image on a plate taken by Shaun Hughes, also Siding Spring. An early orbit shows perihelion to be next March at 2.4 AU. The comet was magnitude 17 at discovery and will not brighten much in the near future.

Periodic Comet Johnson (1990h): Jim Gibson used the 60" reflector at Palomar to recover this comet on June 17. It will not become brighter than magnitude 15.

Periodic	**Comet**		**Encke**			
Date	RA-1950-Dec		RA-2000-Dec		Elong Sky	Mag
08–12	04h04.5m	+30°43'	04h07.6m	+30°51'	74° M	11.1
08–17	04h23.0m	+31°57'	04h26.2m	+32°04'	74° M	10.9
08–22	04h44.0m	+33°10'	04h47.2m	+33°16'	75° M	10.7
08–27	05h08.2m	+34°18'	05h11.5m	+34°21'	74° M	10.4
09–01	05h36.2m	+35°14'	05h39.5m	+35°15'	73° M	10.2
09–06	06h08.7m	+35°49'	06h12.0m	+35°49'	71° M	10.0
09–11	06h46.1m	+35°51'	06h49.4m	+35°47'	69° M	9.7

Arizona Astronomy Center
A Status Report
by Harold Moorin

To bring us up to date, I have made up a resumé of important contacts and an abbreviation of the replies received.

Honorable Rose Mofford, Governor, referred a copy of this letter to Donald E. Cline, Director Department of Commerce: "Please do not hesitate to contact me if you desire further assistance. Wishing you the best for the resolution of this matter."

Honorable Terry Goddard: "I agree that such a center could have some real benefits to this state." He would like written background on the center sent to him.

Senator Dennis DeConcini: "I appreciate learning of your interest in promoting astronomy in Arizona. Over the years, I have supported many astronomy projects in Arizona such as Kitt Peak, Mt. Graham and Steward Observatory. I have also worked to secure funding for a number of Arizona Projects associated with the Hubble Space Telescope, CRAF/Cassini and SIRTF. As a member of the Appropriations Committee, I assure you of my continuing keen interest in this area. My efforts to support Arizona Astronomy will continue."

Phoenix Chamber of Commerce, Jim Haynes, President: "Your plans for an Arizona Astronomy Center sound very exciting, and I think you are correct that it could be a real attraction for residents and visitors alike. We would be happy to participate in any meetings of your support group." He also suggested contacting the Arizona Office of Tourism and the Phoenix and Valley of the Sun Convention and Visitors Bureau.

Fife Symington for Governor: "We need to do all that we can to promote the growth of scientific research in

Arizona. Government can help by providing incentives for scientists to construct new research centers that benefits us all. Please feel free to send me any proposals that you may have regarding the construction of an astronomy center."

Lattice F. Coor, President of A.S.U.: "The plans for an astronomy center were the outcome of a student design project in the College of Architecture. Whether this or other plans can be implemented will depend ultimately on community support such as described in your letter."

Funding for this project could be from Government, Corporate, or Private Endowment or combinations from the possible donars.

This project should contain an observatory, library, meeting and lecture facilities, a planetarium and a museum.

Bits and Pieces

Minutes of the July Meeting

President Pete Burggraaf brought the meeting to order at 7:30 PM. He then discussed upcoming events (see attached calendar). A.J. Crayon and Jerry Rattley discussed the upcoming Deep Sky subgroup meetings. Pete then moved on to new business. A motion was passed to give the money raised in memory of Maynard Clark to the Central Arizona Shelter Services. Cathe Becker then presented the treasurer's report. Harold Moorin presented an update on the "Arizona Astronomy Center." For the Show-and-Tell session, Paul Lind presented an interesting reported on Unsharp Masking Darkroom Techniques. Pierre Schwaar and Jeff Charles then showed results of their video camera work.

After the break Brian Skiff from Lowell Observatory in Flagstaff gave a talk entitled "Un Hombre del Nocturno en Observatio Campanas." Brian talked about his trip to Chile and the myriad and wonderful southern sky deep-sky objects. —*Phil Dahl, SAC Secretary*

1990 SAC Meetings	**1990 SAC Star Parties**
August 10	August 18
September 7	September 15
October 5	October 13
November 2	November 10
December 8	December 15

Directions to SAC Events

SAC General Meetings 7:30 PM at Grand Canyon University, Fleming Building, Room 103 — 1 mile west of Interstate 17 on Camelback Rd., north on 33rd Ave., second building on the right.

SAC Star Parties at Buckeye Hills Recreation Area — Interstate 10 west to Exit 112 (30 miles west of Interstate 17), then south for 10.5 miles, right at entrance to recreation area, one-half mile, on the right. No water and only pit toilets. Please arrive before sunset; allow one hour from central Phoenix.

SAC Deep Sky Subgroup Meeting at John & Tom McGrath's, 11239 N. 75th St., Scottsdale, 998–4661 — Scottsdale Rd. north, Cholla St. east to 75th St., southeast corner.

Adventures in Wide Field Astrophotography

by Chris Schur

Part 2

In this article, I will cover the best methods for testing short focus lens systems photographically, how to evaluate the results of those tests, what the perfect astrofilm for the wide field work should do, and finally, what films are in the real world.

Testing of the Lens

Once a lens is chosen as a potential candidate for skyshooting, it must be tested and evaluated for suitability. Two simple test will reveal the optical condition of a lens: The stop down test, and the trailed focus test. For the first test, mount the camera with the prospective lens system on the back of a driven telescope. Put a fast color film, preferably slide film, in the camera. Aim the scope/camera combination at a bright star field, and engage the drive. Allow a few minutes for the drive to take out the slack in the system. You will not need to guide on any particular star for this test. With the lens all the way open, say a $f/2$ for a typical 50mm lens set at infinity focus, adjust the shutter speed to " B ". Open the shutter and expose for one minute. Next advance the film, and close down the lens one stop. Repeat the one minute exposure. Continue stopping down the lens and exposing until you get to $f/5.6$ or $f/8$. The final result will reveal which focal ratio will be acceptably sharp.

For the second test, turn off the drive or mount the camera on a stationary tripod. Aim the camera up at a similar star field, and open the lens up all the way. Open the shutter and let the stars trail for two minutes. Now very carefully cover the lens with a dark cloth or lens cap, and using a dim light to read the lens, rotate the focus ring about half a millimeter as seen on the distance vernier toward the close focus position. Uncover the lens for another two minutes and recover it. Repeat this process on the single frame until five or six steps are completed. Close the camera's shutter and repeat the whole test if desired. The end result here will determine just where best stellar focus will be achieved. Anytime colored filters are used in front of the lens, especially red ones, this process will have to be repeated.

When the film is processed, carefully study the slides with a minimum of a ten power magnification. A 25mm

eyepiece turned around and used as a magnifier works well. Don't use a slide projector for your evaluations because they introduce their own distortions. For the first test, examine each slide in the sequence carefully, starting with the fastest focal ration first. Note the appearance of the stars in the center, and in the corners of the frame. There will be a point where the stars in the center will appear very sharp and the images in the corners very close to pinpoints. This will be your best compromise between photographic speed and sharpness. This occurs in most lenses between $f/2.8$ and $f/4$. You must decide if a small amount of coma at the edge of the frame is acceptable, or if it must be razor sharp to the edge at the expense of a much longer exposure. A good compromise is one stop down from wide open for good performance on extended objects and reasonably sharp images at the edges of the field.

When examining the results of the second test, look for a progressive enlargement of the width of the trailed star images. That will be only true if the lens is at best focus in it's infinity position. However in half the lenses you may encounter. especially the older used ones, they will focus in a slightly different position. Here you will see the trail narrow after one or two steps, and then become wider again. Check your notes for the position of the lens that corresponded to the narrowest trail. Mark this position on your lens by either scribing a fine line or arrow into the focus ring, or by putting tape on the ring and marking it in pen. This will be the position of true focus, at any focal ratio and this setting will be used for astrophotography.

Films

There is a wide selection of films on the commercial market suitable for various forms of terrestrial photography, but only a small handful of them are suitable for skyshooting. What are the characteristics of a good film suitable for wide field astrophotography, and what should I expect from them?

Certainly high film speed comes to mind for many budding astrophotographers, yet with fast lenses used in wide field work, this may not be the best choice. many of the objects recorded will be small on the frame, so a finer grained and slower film will work out much better. With a lot more light from the faster focal ratios to work with compared to prime focus through the scope astrophotography, sky fog will be more of a problem. Also a higher contrast film is desirable to help differentiate the nebula from the bright sky background.

Another desirable characteristic is good red speed. Many of the targets most suitable for the wide field camera are emission nebula. Since their primary color is a deep red from H-Alpha light emission, they require a film that will respond adequately to this wavelength. The best film choice will also include low reciprocity failure — the ability of a film to keep on recording fainter and fainter objects in long exposures. Most films off the shelf are poor in this regard.

Unfortunately, no one film can be said to have all the aspiring characteristics that are needed. In fact, most color films are totally unsuitable because of low contrast or very low red speed. Fortunately, there are a few decent films to use that will meet most of our criteria.

For color slides, Ektachrome 400 is still the best for red sensitivity and high contrast. However it has a fairly high reciprocity failure in exposures longer than 15 minutes. Agfachrome 1000 slide film has been very well received despite its somewhat larger grain. It has good red speed, and a very pleasing neutral colored sky background, even with more light polluted skies. I recommend this this film for beginning sky shooters.

For color prints, Kodak VRG400 works fairly well, but many have had surprisingly good results with Konika SR1600 film. For B&W users, hypered tech pan — 2415 emulsion is by far the best choice. In lieu of a hyper tank, the Tmax 400 has good reviews for Milky Way photography, but is poor in the red region of the spectrum.

What I hope was accomplished in this article was to save the budding astrophotographer a great deal of time and suffering trying to select a suitable lens and film combination for wide field work.

Such-A-Deal

SUCH-A-DEAL is a place to advertise equipment, supplies, and services related to amateur astronomy. This is a free service for SAC members and friends. SAC is not responsible for the quality of advertised items or services.

Telescope—6" Criterion Dynsascope Newtonian reflector with clock drive and eyepieces, incl. Erfle wide-angle, Orthoscopic, and Ramsden; in good condition but primary needs cleaning and alignment; $150 (or free to deserving organization); Scott Ringwald, 839–5329.

Telescope—Meade 2080 LX3. Excellent condition, barely used. Enhanced coatings, piggyback mount, heavy duty tripod. $850. Lumicon off-axis guider, $150. Dan Ward 998-4033.

"Barndoor" Tracker—same design built as club project, complete except for batteries and camera, $125. Specially-made heavy-duty tripod for tracker, $75. Pete Burggraaf 995-1964 (H) 995-4273 (W)