SAN FRANCISCO
Amateur Astronomers
SHARING THE WONDERS OF THE UNIVERSE

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BULLETIN FOR AUGUST 1991

LET'S MAKE THE NEXT ISSUE A SPECIAL EDITION CELEBRATING OUR MEMBERS' ADVENTURES AT THE SOLAR ECLIPSE! WHETHER YOU OBSERVED IN BAJA, HAWAII OR SAN FRANCISCO, SEND YOUR STORIES, ANECDOTES AND DRAWINGS TO SFAA BULLETIN, C/O JIM SHIELDS, 190 CHILTON AVENUE, SAN FRANCISCO 94131 NOT LATER THAN AUGUST 18 FOR INCLUSION IN THE SPECIAL ECLIPSE ISSUE.

Time: WEDNESDAY, AUGUST 21, AT 8:00 PM

Place: THE RANDALL MUSEUM
199 Museum Way, San Francisco

Topic: WHEN THE SUN STOPS SHINING!

Speakers: JOHN DILLON
Science Curator at The Randall Museum

MEMBERS OF THE SFAA

John Dillon's extensive science background includes research in coral reef ecology as a marine biologist. He taught oceanography in the 70's at UC Berkeley and at SF State in the 80's. He also leads international natural history trips to locations ranging from Alaska to the Amazon.

John is also an avid amateur astronomer who has built his own telescope. He viewed the solar eclipse from Costa Rica and will be sharing his slides and experiences at this extraordinary event with us.

We also expect to have reports and pictures from SFAA members who observed and recorded the solar eclipse. All members are encouraged to bring their pictures and memories of this experience, and to share them with all of us.

NEXT SFAA STAR PARTY AUGUST 10

The club's next star party at Rock Springs on Mount Tamalpais is Saturday evening, August 10, beginning at dusk. Plan to arrive by 8:00 to hear Dr. Bob Haberle of NASA-Ames Research Center talk on "The Exploration of Mars - Past, Present, Future" in the nearby Mountain Theatre. The talk is co-sponsored by the Planetary Society Volunteer Network.

> "I saw two shooting stars last night
> I wished on them, but they were only satellites
> Is it wrong to wish on space hardware?
> I wish I wish I wish you'd care."
>
> - B. Bragg, "A New England"
> (Contributed by Mary Engle)

JULY SFAA STAR PARTY - by J. Douglas Wolfe

Those of us who did not get to the eclipse got our reward on July 13th. The fog came in over San Francisco thick and early, covering The City's lights and turning the sky a lovely shade of black. Venus, Mars, Jupiter and Regulus formed a breathtaking tableau with the vanishingly skinny Moon as darkness fell. The public stood cheerfully in long lines to see the familiar summer show objects: the Ring Nebula, the Hercules cluster, the Omega Nebula. The inky fog over San Francisco allowed for unusually fine viewing in the object-rich areas of the southern Milky Way which are so often washed out by The City's lights. The Trifid and Lagoon Nebulae stood out in high relief against an uncharacteristically black background. There seemed to a lot of meteors as well -- random "oohs," "aahs," and "oh, wows" could be heard from all directions as the night wore on.

It seems that interest in astronomy had been piqued by all the eclipse publicity. As the Rock Spring parking lot filled to capacity, it became clear that the relatively small number of telescopes on hand would be extra busy after the lecture. Perhaps as many as two hundred people had come to enjoy the balmy weather and fine viewing. Many families arrived to enjoy the night sky, and a dozen people or so had returned after being introduced to astronomy at the June gathering. Bill Cherrington and Rex Bell were among the familiar members who set up their scopes. Dave Kutilek, a new and enthusiastic SFAA member, helped to welcome the public. Michel from the Exploratorium brought two four-inch scopes. Those members who were still enjoying their trips to Hawaii and Baja were sorely missed, though. All night long we could hear our guests asking "where are all the light buckets?"

SUN BIZ - by Eppler Nowell

Sol's scheduled season of flare activity starts some two years after the peak of the sunspot cycle. We here on Earth can now by expected to be bombarded by particles thrown from the Sun for the next two or three years. Last month we commented on Sol's tremendous solar storms reported by the media in early June. Of course, these storms were overshadowed by the spectacular eclipse on July 11th.

The reason for this media attention is that we on Earth have become increasingly aware of the interruptions and damage that the solar flares can cause to our electrical/electronic equipment upon which we have become so dependent. Flare-related radiation from the Sun causes geomagnetic storms which can cause costly damage to electric power company installations and interrupt high-frequency radio communications. High-energy particles can actually damage satellite electronic circuits. Of course, we are often treated to beautiful aurora displays as well.

For the first two weeks of June Solar Region 6659 was responsible for all the commotion. This was not an extraordinarily large region. Its one big predominant spot set no size records although it was easily visible to the naked eye. Day-to-day, this one large spot showed us a neat confirmation of the theory that a sunspot region will probably produce flares when the spots rearrange themselves rapidly. And this region did produce a greater number of extraordinarily large flares than any other region on record.

During its nearly two week's passage across the Sun's face, the region gave us five flares of such great X-Ray intensity that they saturated the sensors of the GOES-7 satellite, making precise measurements impossible. Most flares last only a few minutes, but the first of these lasted nearly four hours! This is a tremendous amount of energy loosed into space! While electromagnetic radiation from the Sun takes only eight minutes to reach the Earth, the heavy, low-energy particles, protons, electrons and neutrons take 24 to 40 hours to reach the Earth and start their business of producing magnetic storms, ionospheric storms and the aurora.

As our rogue sunspot region passed across the Sun's west limb on June 17, it gave us one last hurrah flare, sort of an, "I'll be back!" And back it was, on July 1, this time renumbered as Solar Region 6703. Only one sizable flare occurred on this second pass across the Sun's face--July 11, the day of the eclipse. The sunspot group was positioned on the Sun's northwest face where it escaped being shielded by the passing Moon.

(Query - Did this sunspot group produce the gigantic naked-eye prominence visible during the solar eclipse? - Ed.)

AUGUST LIST OF MESSIER OBJECTS by Dennis Tye

The seventh installment of the Messier list. This month there are twelve objects listed - six globular clusters, four open clusters and two diffuse nebulae. Another fun month - all easily found objects.

NGC#	MES	RA	DEC	Mag	TYP	SIZE	DIST	CON	DESCRIP
6218	012	16 44.6	-01 52	06.6	GCL	009.3'	5.8K	OPH	

This globular and the next, M10, are just about twins, about the same size and brighness. Many stars should be resolvable.

6254	010	16 54.5	-04 02	06.7	GCL	08.2'	5.0K	OPH	

(see M12)

6266	062	16 58.1	-30 03	06.6	GCL	004.3'	6.9K	OPH	

A smallish, but bright globular. Should be able to resolve individual stars. Try higher magnification.

6273	019	16 59.5	-26 11	06.6	GCL	004.3'	6.9K	OPH	

Lots of look-alike globulars in this month's list. This one's similar to M62, which is quite close by. You can cheat and use your fine controls, rather than the setting circles to get here from M62.

6333	009	17 16.2	-18 28	07.3	GCL	002.4'	8.0K	OPH	

This globular and the next, M14, are a good test of the light gathering power of my finder, a 8x50. I can barely see M9 in the finder, whereas I have to use averted vision to acquire M14. In the main scope, M9 is 2-3 arc minutes in size with a few stars resolved.

6402	014	17 35.0	-03 13	07.7	GCL	003.0'	7.2K	OPH	

Another pair of twins, M9 and M14.

6405	006	17 36.8	-32 11	05.3	OCL	025'	0570	SCO	Butterfly

A large open cluster with 80+ members visible. The brighter stars form a trapezoidal figure.

6475	007	17 50.7	-34 48	03.2	OCL	060'	0380	SCO	

A very large open cluster with 80+ members at 10 mag or brighter. One degree field, use low power or view in finder.

6494	023	17 54.0	-19 01	06.9	OCL	025'	1380	SGR	

An open cluster with about 120 stars. Full field in eyepiece.

6514	020	17 58.9	-23 02	6.91	DIF	029'x027'	0670	SGR	Trifid

The Trifid nebula. Can you see the dark lanes dividing it in thirds?

6523	008	18 01.6	-24 20	6.79	DIF	060'x035'	0770	SGR	Lagoon

Similar to M20, a bright nebula with a dark lane bisecting it.

6531	021	18 01.8	-22 30	06.5	OCL	010'	0910	SGR	

Found this cluster larger than described, many mod'ly bright stars

The Globulars of Sagittarius

by *STEVE GOTTLIEB*

As the warm summer evening twilight fades and the night skies are revealed, our gaze is always drawn to the magnificence of the summer milky way. Here the awesome star fields are peppered with clusters, and nebulae as we gaze along the spine of our galaxy. I always find myself, though, returning to the glowing globulars-symmetrical spheres of one hundred thousand to one millionstars which formed in the earliest stages of our galaxy ten to fifteen billion years ago. As Harlow Shapley deduced, the globular clusters form a halo around our galactic nucleus and as the center of the milky is located in the direction of Sagittarius, we naturally find the highest concentration in this constellation. Of the 150 or so known globulars, 29 can be found in this constellation, 24 more in Ophiuchus while 18 reside in Scorpius. Between these three constellations, this amounts to nearly half of the total numbers of globulars.

Globulars tend to be relatively bright and compact and so often they have a very high surface brightness. This is despite the fact that they often lay in the direction of heavy obscuration by dust in the plane of the milky way which can diminish starlight by several magnitudes. The brightest globulars like Omega Centauri, and even M13 are naked-eye objects while the smallest optical aid including your finder scope will reveal scores of globulars.

Although they are similar as a class, globulars vary considerably in appearance visually. Except for highly obscured or distant globulars, they are easy to locate as a class, so the principal challenge for the visual observer is the degree of resolvability into stars. This depends greatly on 3 factors. First, is the degree of concentration of the stellar members in the cluster (rated on a 1 to 12 scale with a smaller number indicating a concentrated cluster and a larger number indicating a loosely packed cluster). Tightly packed clusters tend to resist resolution but will have a high surface brightness. This aids some extremely distant clusters such as NGC 2419 in Lynx to be easily visible in an 8" scope. Secondly, the distance to the globular plays a factor with the closest globulars like M4 and Omega Centauri generally appearing larger and brighter. Medium or loosely concentrated clusters may allow a high degree of resolution in an 8" if they are relatively nearby. A third factor which can come into play is the extent of dust in the plane of the milky way along our line of sight to the object. Some globulars discovered photographically in the past 35 years are visually unobservable due to a combination of a sparse population, extreme distance, and high obscuration of dust in the galactic plane.

The easiest place to start is Lambda, which forms the top of the "teapot". Just 40' east, you'll find NGC 6638, a compact object with a high surface brightness. In my 17.5" it appears fairly bright and round, just 2 arc minutes in diameter. The halo has a fairly even surface brightness but increases in to a small bright core. At 220X, a few very faint stars, magnitude 15-16 are resolved at the mottled edges of the halo.

Head back to Lambda and move 1° northwest and you'll run across M28, discovered by Messier in 1764. Although his description, reads in part "nebula containing no star", my C-8 at 200X just resolved the lively halo into many faint stars. With a 13", M-28 appears very bright, and fairly large with a highly mottled core. and the outer halo is resolved into many stragglers arranged in long spidery chains. A few dozen stars are resolved at 290X including a prominent star chain leading to the north.

If you scoot your scope 2.5° northeast of Lambda and glance in your finder, you should easily find M22, the crown jewel globular in Sagittarius. This globular was known before Messier's time, and its discovery is generally attributed to an obscure amateur, Abraham Ihle. In a dark sky, this globular is a faint naked-eye object and is a strong rival to M13 in beauty. My C-8 revealed a few 100 stars mag 11-13 blanketing the core and halo. In my 17.5" operating in a dark sky, the extreme richness is shocking and takes your breath away!

A pair of globulars, NGC 6522 and NGC 6528 can be easily found just northwest of Gamma, which forms the spout of the "teapot" which is

embedded in the rich milky way. In my 13", NGC 6522 appears moderately bright and mottled, with one brighter star visible on the east side but no other resolution. You'll find NGC 6528 in the same field 15' east. This globular appears as a fainter twin of NGC 6522, though prominently visible in my 13", I found no resolution into stars.

If you head east to third magnitude Delta, you should find NGC 6624 in your finder scope just 50' to the southeast. This globular has a very high surface brightness and appears very symmetrical, about 3' in diameter. The center contains a sharp bright core and a stellar nucleus. With my 17.5" there are hints of resolution in the outer halo particularly on the north edge with six stars magnitude 15 glimpsed. A close double star with components of 12th and 14th magnitude is located 2' WSW and the star field in general is rich in faint stars.

About 2.5° SE of NGC 6624 you'll run across M69, discovered by Lacaille at the Cape of Good Hope in 1752. With a high surface brightness, you should have no problems with this globular, and in my C-8 it appears fairly bright, with a bright core and a lively halo. A few stars are resolved at the edges and my 17.5" resolves the halo into a mass of faint stars.

Continue another 1° southeast from M69, and you'll find NGC 6652, 7' southeast of a 7th magnitude field star. This high surface brightness globular has a compact bright nucleus in my C-8 and a 13th magnitude star is visible at the southwest edge but no other resolution was seen. With a 17.5" scope, NGC 6652 is fairly bright, and slightly elongated east-west, 2.0'x1.5' in dimensions. A sharply defined small bright core is prominent with a substellar nucleus embedded. The outer halo is mottled but unresolved except for the 13th magnitude star 1' WSW of the nucleus and a 14th magnitude star at the east edge of the halo.

From here a 1°40' jaunt to the northeast will bring you to M70, discovered by Messier in August 31, 1780. With my C-8 operating at 220x, a few faint stars are resolved in the halo but the bright core remains unresolved. The halo is unsymmetric, being slightly flattened on the east side. A very small bright core is prominent in my 13", and many faint stars glitter in the outer halo while a bright string of stars trail to the north-northeast direction.

Although there are no bright naked-eye stars in this region, a 3° shift to the northeast should reveal M54 in your finderscope. Messier made this discovery on July 24th of 1778. This globular has an unusually high surface brightness yet is not easy to resolve. With my 17.5" it is moderately large, 3' in diameter and very bright, increasing to a sharp bright core. The globular has a grainy, mottled appearance and five brighter stars (possibly field stars) are visible around the edges.

From here, let's head south just over 6° towards the Corona Australis border to a remarkable region containing the globular cluster NGC 6723 and a complex nebulous region in the same field including NGC 6726/27/29. NGC 6723 is a showpiece globular and would have been picked up by Messier if it was further north. An 8" begins to resolve the cluster around the edges of the mottled disc while my 13" and 17.5" reveal dozens of stars across the disc and at the edges of the halo.

Let's continue our journey at the Lagoon Nebula. Don't get hung up in this area but tear yourself away and head 50' SE to NGC 6544. With my C-8 a brighter core is visible with 2 stars resolved in the core and a few stars at the edges of the halo. Although grainy, the cluster resists further resolution. At 220X, this cluster appears 4'x3' in my 17.5", elongated northwest-southeast. The outline is noticeably irregular and several faint stars and other field stars are resolved at the edges. Several superimposed stars are visible over the mottled disc including 2 or 3 mag 13 stars in a tight knot near the center.

To end our tour of the Sagittarius globulars, we head southeast out of the milky way and scan about 8° east of mag 2.6 Zeta. You should have no problem picking out M55 in your finder. This globular was another Lacaille find in his journey to the Cape in 1752. With a concentration class of 11, this object is very loosely compressed and resolves easily in small scopes. In my C-8, scores of faint stars are scattered across the entire 10' diameter. Due to its low concentration, there is no compact core, just an unresolved background haze. M55 appears nearly fully resolved in the 13" and 17.5" with a couple of hundred stars of varying brightness glowing over a background haze.

JEAN DOMINIQUE CASSINI AND SATURN

Joel W. Goodman

Last month in our discussion about Saturn we mused about the discovery of the major division in the ring system by the Italian astronomer Jean Dominique Cassini in 1675 as well as the almost simultaneous discovery of the Crepe Ring in 1850 by the Bonds at Harvard and Reverend Dawes in England. The ringed planet abounds with fascinating observational history, beginning with Galileo's description of a "tripartite body" based on his inability to clearly resolve the globe and rings with his crude "spyglass", which can be justly dubbed the first astronomical telescope because of the monumental discoveries he made with it. Cassini was an assiduous planetary observer and discovered four of Saturn's satellites in addition to the ring division named after him. He was a giant among 17th century astronomers and a closer inspection of his achievements is clearly worthwhile.

Cassini, like Galileo, was Italian, and from the age of 25 he spent 19 years as professor of astronomy at Bologna, where he distinguished himself as an observer and mathematician. His achievements during this early period of his career included discovering the rotations of Jupiter and Mars and some of their surface features, as well as computation of the orbital motions of Jupiter's Galilean satellites. As a consequence of these achievements, Cassini became renowned throughout Europe and in 1669 he was invited to Paris by King Louis XIV to supervise a new observatory. Cassini's telescopes at the Paris Observatory, while high tech for their time, were little better than the instrument Galileo used about 65 years earlier. Telescopes of that period were described by their focal lengths, and Cassini's instruments, made by Italian masters such as Campani and Divini, ranged from 17 feet to more than 135 feet. I have been unable to find the apertures of Cassini's telescopes, but even the largest was probably little more than 2 inches. The incredibly long focal ratios reduced the chromatic aberration of the single element lenses used in telescopes until the later introduction of achromatic lenses and mirrors. The quality and ungainly length of the telescopes used by 17th century astronomers makes their accomplishments all the more remarkable.

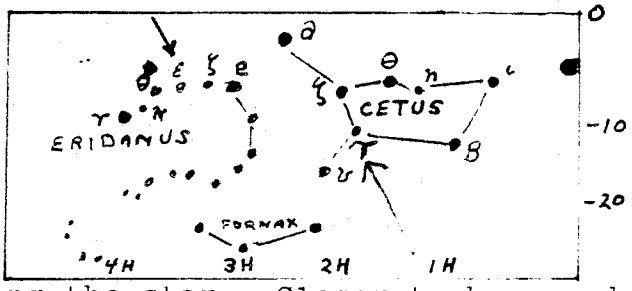
In addition to discovering the major division in Saturn's rings in 1675, Cassini also discovered four of the planet's satellites. Titan had been discovered in 1655 by the great Dutch astronomer Christiaan Huyghens, using a 12 foot telescope of his own fabrication bearing a magnification of 50. Titan, of course, is by far the brightest of Saturn's moons and can be viewed with powerful binoculars. In 1671, Cassini discovered Iapetus with a 17 foot telescope, identifying it as a satellite by its motion with respect to nearby stars, and discovered a third satellite, Rhea, the following year. Rhea is much closer to Saturn than Titan or Iapetus, and, like Iapetus, was a very difficult object for the telescopes in use at the time. Their difficulty prompted Cassini to record the following remark in his notebook: 'The apparent magnitude of these planets is so little, that posterity will have cause to wonder, that their discovery was begun by a Glass of 17 foot' (note the archaiac punctuation and phraseology).

Twelve years passed before the discovery of additional satellites. In early 1684, using extremely unwieldy telescopes with object lenses of 100 and 136 foot focal lengths made by Campani, Cassini found two more satellites, Tethys and Dione, both fainter and closer to Saturn than Rhea is. The five satellites known at the time (Titan, Iapetus, Rhea, Tethys and Dione) are all within the grasp of modern 4-inch telescopes. Cassini went on to establish that they all obeyed Kepler's laws of planetary motion.

It is interesting that Cassini wanted to name the four satellites he discovered after his patron Louis XIV, a common practice of the period. After all, Galileo had named the four bright moons of Jupiter in honor of his patron, the Grand Duke of Tuscany. The chauvinistic names of satellites have not survived; their present names, derived from classical mythology, were suggested by Sir John Herschel early in the 19th century. But despite their unsuccessful attempts at satellite naming, Galileo Galilei and Jean Dominique Cassini stand prominently among the towering figures in the astronomical hall of fame.

SETI: TWO STARS WORTH LOOKING INTO. by Gordon Ridley

In the search for extraterrestrial intelligence there are potentially one million inhabited planets among the four hundred billion star systems in the Milky Way Galaxy, or so say many astronomers plus a few others. While we have been expecting a call from any one of them, nothing has been received as yet. But==plans are now under way to target 800 known sunlike stars within 80 light years of earth. Three now under intensive scrutiny include the star Beta Pictoris, the second brightest star in Pictor, visible from the southern hemisphere, where the Hubble Telescope has observed a gas disk ringing the star. Closer to home and easily visible to us here are Epsilon Eridani, a mag 3.73 star, at 3H 32' 55.8" - 9° 27' 30", nearly 11 light years away, and Tau Ceti, mag 3.5, at 1H 44' 04" - 15° 56' 15", 12 light years away. Why not enjoy a good look at these two stars next time you are up on Mt. Tamalpais. You will find them on Chart 10 of Sky Atlas 2000. Put them on your list of observed stars against the day when you are suddenly surprised by one or the other of them, with the words "Hello Earth, here we are!"



SFAA MEMBERSHIP BENEFITS

The club offers three categories of membership, with annual dues as follows:

Regular Membership - $20
Family Membership - $25
Junior Membership - $ 5 (for astronomers under 18)

SFAA members receive the monthly Bulletin and free admission to club activities including monthly lecture meetings and star parties, field trips and the annual picnic. In addition, they may subscribe to several astronomy magazines at greatly-reduced rates. For more information, contact Chelle Beard, 32 Penhurst Avenue, Daly City 94015. Telephone 878-4965 evenings.

COMET COMMENTS

07-09-91

Two new comets have been discovered and two returning comets recovered recently. Meanwhile, several comets, three of them being in the morning sky, should be visible in our telescopes this month.

Periodic Comet Chernykh (1991o): Jim Scotti and D. Rabinowitz recovered this comet from Kitt Peak on June 8. It orbits the sun every thirteen years, is presently magnitude nineteen, and is not expected to get brighter than magnitude thirteen.

Periodic Comet Shoemaker 1 (1991p): P. Kilmartin and Alan Gilmore recovered this comet from Mt. John Observatory (New Zealand) on June 8. This is its first pass since discovery in 1984 and it is not expected to get brighter than magnitude twelve.

Comet Levy (1991q): David Levy of Tucson, Arizona discovered this, his seventh visually-found comet, on June 14 in the morning sky. He was using his 16" reflector, and had swept for 81 hours since his previous visual find thirteen months earlier. The comet was near the galaxy M 74 and at about eighth magnitude.

The orbit brought the comet closest to the sun at 0.995 AU on July 7. It will hang in our morning sky for the next few months, dimming to magnitude eleven by mid-October. The comet was in good position for discovery for many weeks before it was actually found, so perhaps it outburst shortly before discovery. I swept the area on June 6 and June 12 without seeing it. At least one other comet hunter swept over it on June 12 under partly cloudy skies.

Comet Helin-Alu (1991r): Eleanor Helin and Jeff Alu discovered this comet on June 13 from Palomar. An early orbit suggests that it was closest the sun at 5.6 AU last March and it will not get brighter than magnitude sixteen.

EPHEMERIDES

PERIODIC COMET MACHHOLZ

DATE (UT)	RA (1950)	DEC	RA (2000)	DEC	ELONG	SKY	MAG
07-28	09h20.6m	+28°59'	09h23.5m	+28°47'	16°	E	6.6
07-31	10h00.9m	+28°58'	10h03.8m	+28°43'	22°	E	7.8
08-03	10h39.3m	+27°44'	10h42.1m	+27°22'	27°	E	8.6
08-06	11h15.2m	+25°38'	11h17.9m	+25°22'	33°	E	9.3
08-09	11h48.1m	+22°58'	11h50.6m	+22°42'	37°	E	9.9
08-12	12h17.5m	+19°58'	12h20.0m	+19°42'	42°	E	10.4
08-15	12h43.6m	+16°51'	12h46.1m	+16°35'	46°	E	10.9
08-18	13h06.6m	+13°47'	13h09.1m	+13°31'	49°	E	11.4
08-21	13h26.9m	+10°52'	13h29.4m	+10°36'	52°	E	11.8
08-24	13h44.8m	+08°08'	13h47.3m	+07°53'	54°	E	12.2
08-27	14h00.8m	+05°38'	14h03.3m	+05°24'	55°	E	12.6
08-30	14h15.0m	+03°22'	14h17.6m	+03°08'	56°	E	12.9
09-02	14h27.9m	+01°18'	14h30.5m	+01°05'	57°	E	13.2
09-05	14h39.6m	-00°34'	14h42.2m	-00°47'	57°	E	13.6

EPHEMERIDES (continued)

DATE (UT)	RA (1950)	DEC	RA (2000)	DEC	ELONG	SKY	MAG
PERIODIC COMET HARTLEY 2							
07-28	02h06.5m	+27°23'	02h09.4m	+27°37'	85°	M	11.1
08-02	02h37.5m	+29°15'	02h40.5m	+29°28'	83°	M	10.8
08-07	03h10.8m	+30°41'	03h13.9m	+30°53'	80°	M	10.5
08-12	03h45.7m	+31°36'	03h48.8m	+31°45'	77°	M	10.3
08-17	04h21.3m	+31°53'	04h24.5m	+32°00'	74°	M	10.0
08-22	04h56.6m	+31°33'	04h59.8m	+31°37'	72°	M	9.9
08-27	05h30.6m	+30°38'	05h33.8m	+30°40'	69°	M	9.7
09-01	06h02.6m	+29°15'	06h05.8m	+29°15'	67°	M	9.7
09-06	06h32.3m	+27°30'	06h35.4m	+27°27'	65°	M	9.6
09-11	06h59.4m	+25°30'	07h02.5m	+25°26'	64°	M	9.6
PERIODIC COMET WIRTANEN							
07-28	04h23.5m	+12°58'	04h26.3m	+13°05'	58°	M	11.6
08-02	04h43.1m	+14°08'	04h46.7m	+14°13'	58°	M	11.4
08-07	05h05.0m	+15°12'	05h07.8m	+15°16'	57°	M	11.1
08-12	05h26.7m	+16°10'	05h29.6m	+16°12'	57°	M	11.0
08-17	05h48.9m	+17°01'	05h51.8m	+17°01'	56°	M	10.8
08-22	06h11.6m	+17°43'	06h14.5m	+17°41'	55°	M	10.6
08-27	06h34.6m	+18°15'	06h37.5m	+18°13'	55°	M	10.5
09-01	06h57.8m	+18°38'	07h00.7m	+18°34'	54°	M	10.4
09-06	07h20.9m	+18°51'	07h23.8m	+18°45'	53°	M	10.3
09-11	07h43.9m	+18°53'	07h46.8m	+18°46'	53°	M	10.2
COMET LEVY (1991q)							
07-28	05h14.4m	+35°31'	05h17.4m	+35°34'	45°	M	8.1
08-02	05h37.8m	+36°17'	05h41.1m	+36°19'	45°	M	8.3
08-07	06h00.1m	+36°46'	06h03.4m	+36°46'	45°	M	8.5
08-12	06h21.2m	+36°59'	06h24.6m	+36°58'	46°	M	8.6
08-17	06h41.0m	+37°00'	06h44.4m	+36°57'	46°	M	8.9
08-22	06h59.6m	+36°51'	07h03.0m	+36°47'	47°	M	9.1
08-27	07h16.9m	+36°34'	07h20.2m	+36°29'	49°	M	9.4
09-01	07h32.9m	+36°11'	07h36.2m	+36°05'	50°	M	9.6
09-06	07h47.7m	+35°44'	07h51.0m	+35°37'	52°	M	9.8
09-11	08h01.3m	+35°15'	08h04.6m	+35°06'	53°	M	10.0

Don Machholz (916) 346-8963

The Tale of NGC 6816

by STEVE GOTTLIEB

Over the past ten years I have pursued a visual survey of all NGC objects north of -50° declination using my 13" and 17.5" reflectors. Although the vast majority of these objects are faint 14th and 15th magnitude galaxies, I've enjoyed the challenge of tracking them down and identifying them using a variety of modern sources. But here's the rub. Until recently, the only complete update to the original NGC has been the *RNGC*, by Sulentic and Tifft, published in 1973. In comparing my observations with other modern galaxy catalogues and the Palomar Observatory Sky Survey, I became aware of many ambiguities and obvious identification errors in the RNGC and furthermore, the number of these errors increased within rich galaxy clusters and the thousands of very faint NGC galaxies found singly and in small groups.

Fortunately, at UC Berkeley I had access to various historical catalogues including those from William and John Herschel and Lord Rosse, who discovered a large percentage of the NGC entries. In many cases, reference to their original visual notes and sketches illuminated catalogue discrepancies and provided an historically correct identification. At this point the number of entries in the RNGC with erroneous information that have been uncovered by various investigators, principally Dr. Malcolm Thomson, Dr. Harold Corwin and myself is approaching 500. Most of these corrections have been incorporated into the new *NGC 2000.0* from Sky Publishing which provides improved data on the NGC, IC I and IC II.

Here's a case study on how these errors get uncovered. On June 8th from the Fiddletown observatory I observed some faint galaxies in eastern Sagittarius and took a look at NGC 6816 found on Uranometria chart #380. As in often the case, two galaxies were found in the field, oriented north-south with a 6' separation. Although both galaxies were faint, the southern galaxy was more prominent as the northern galaxy was just east of a distracting 9th magnitude star and furthermore had two faint stars involved at the west and north-west edges which confused the observation.

The original NGC visual description from John Herschel reads "extremely faint, pretty small, round, very little brighter in the middle, star northwest" while the RNGC photographic description states "elliptical, slightly elongated, dark patches, star near west". As both descriptions mention a star west or northwest this led me to conclude that the northern galaxy was NGC 6816 and the southern galaxy was an anonymous galaxy not reported in the NGC or IC. I then checked the *ESO-LV* catalogue for verification and found both galaxies listed with 1950 coordinates of 19h40.9 -28°36.5' and 19h40.9 -28°31.3' and the northern member was also identified as NGC 6816.

Case closed? Not quite, because I found it disturbing that the anonymous galaxy was visually more prominent than the so called NGC galaxy! The first thing I did was precess the original 1860 coordinates in the NGC to 1950 epoch, and to my surprise I found that the southern (anonymous) galaxy was much closer to the original position. Still the NGC description did mention a star close northwest which agrees with the northern RNGC galaxy.

The final step was to examine Herschel's original notes (obtained from the UC Santa Cruz Astronomy library) to solve the dilemma. While at the Cape of Good Hope he discovered this galaxy on July 30, 1834. Here are Herschel's exact words,"extremely faint, round, very little brighter in the middle, 40" diameter, a *9 magnitude north of it, at 6' distance has what may be easily taken for a nebula attached to it, but it is only a little group of vS stars."

Based on his position of the 9th magnitude star 6' north, there can be no doubt the southern galaxy of the pair in question is Herschel's NGC 6816. Ironically, Herschel unknowingly observed the northern galaxy although he felt it was only a group of faint stars. The conclusion to this tale is that the identification of NGC 6816 is incorrect in the RNGC and the data should be changed to describe the galaxy 6' to the south at 19h42.4m -28°33' (1975).

San Francisco Amateur Astronomers
The Randall Museum
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