

# Saguaro Astronomy Club

Metro Phoenix, Arizona

## SACNEWS



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## Discovery History of the Deep-Sky Objects

by Hartmut Frommert

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*This article is a text version of Hartmut's Web page <http://www.seds.org/messier/xtra/history/deepskyd.html>. It is printed here with permission. Hartmut requests comments, corrections or suggestions about his Web page.*

*Hartmut is the creator of the SEDS Messier Database which is at <http://www.seds.org/messier/>.*

### Part 1

Since the earliest times, humans could view stars at night whenever it happened not to be cloudy. As in pre-historic times, there was barely any light pollution in most regions of Earth, our ancestors could view very faint stars, and thus some of those objects we now summarize as Deep-Sky Objects. This way, some of these objects are known as long as anything is known.

The most remarkable such "object" is certainly a galaxy, our own Milky Way; however we will not count this one here. Essentially the same is true for the most remarkable "moving" star cluster, the Ursa Major group, which consists of most of the stars in the famous "Big Dipper" asterism and makes up the more conspicuous part of Ursa Major. These omissions are justified first because most people nowadays don't view them as "Deep-Sky Objects", and second because their nature, i.e. that the Milky Way is a galaxy, and that the Ursa Major stars are a physical cluster, did not become apparent before modern times.

Some of the bright star clusters must also have been known very early, even before the time covered by any ancient records; these certainly include the Pleiades (M45) and the Hyades clusters in Taurus, which are conspicuous to the naked eye, and recorded early (i.e., the first certain document on the Pleiades is Hesiod, about 1000 BC). In the Southern Hemisphere, the two Magellanic Clouds (LMC — the Large Magellanic Cloud, and SMC — the Small Magellanic Cloud) were certainly known since

### Quick Calendar

#### SAC Meeting

Speaker: Dr. David Burstein  
7:30 PM, Friday, September 27

#### SAC Star Party

Buckeye Hills Recreation Area  
Saturday, October 5

#### Kitt Peak Cook-out & Star Party

Reservations Required, See September SACNEWS  
Saturday, October 5

#### All-Arizona Star Party

Arizona City Site  
Friday & Saturday, October 11-12

#### Public Star Party

Thunderbird Park  
Saturday, October 19

#### SAC Meeting

7:30 PM, Friday, October 25

earliest times, but not many recordings are preserved from the ancient Southerners.

It may be that Aristotle recorded ancient observations of the open star cluster M41 in Canis Major around 325 BC; this would make this cluster the faintest object

### SAC Officers

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DIM MOMENTS  
IN  
**AMATEUR  
ASTRONOMY**  
by Paul Dickson

SHARING THE  
VIEW  
OF THE  
TRIFID NEBULA...

...WITH  
A  
RATTLESNAKE

reported in ancient times. According to Burnham, based on the quote by P. Doig in 1925 of a statement made by J.E. Gore, it could be possible that Aristotle also observed M39 in Cygnus about that time, as a “cometary appearing object.”

**Hipparchos**, the famous ancient Greek astronomer, did his observations from Rhodes between 146 and 127 BC. He was the first astronomer who compiled a catalog of stars; this work was perhaps triggered by the observation of a “New Star” (Nova) in the constellation Scorpius in 134 BC. He included two “nebulous objects” in his catalog, the Praesepe star cluster (M44) and the Double Cluster in Perseus, also called  $\eta$ + $\chi$  Persei (NGC 869+884, not in Messier’s catalog).

**Ptolemy**, in his *Great Syntaxas* compiled 127–151 AD (better known as the *Almagest*), lists 7 objects, 3 of which are asterisms of little interest and not physical ob-

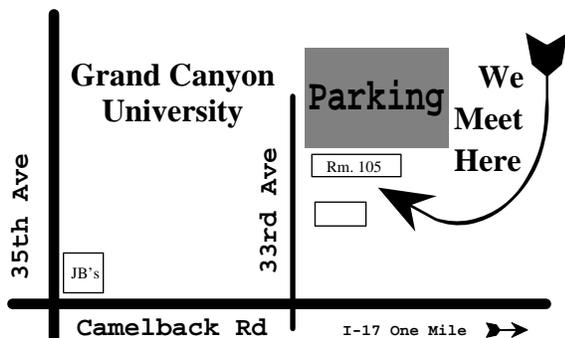
jects, two are those taken from Hipparchos (M44 and the Double Cluster in Perseus), but two are new: “A Nebula behind the Sting of Scorpius” which has now been identified as the conspicuous open cluster M7, which the present author proposes that it be named “Ptolemy’s Cluster”, and the Coma Berenices Star Cluster, now cataloged as Melotte 111 (but not in Messier’s catalog).

The first really “nebulous” object to be discovered and documented was the Andromeda Galaxy (M31), observed around 905 AD and documented 964 AD by the Persian astronomer Al Sufi in his *Book of Fixed Stars*. He also mentions a “nebulous star” little more than 2 degrees north of  $\delta$  Velorum, which is most certainly the open cluster IC 2391, or *o* Velorum. He also includes 6 of Ptolemy’s objects, and a new asterism (in Vulpecula), so a total of 9 entries.

No more new deep sky objects were discovered until

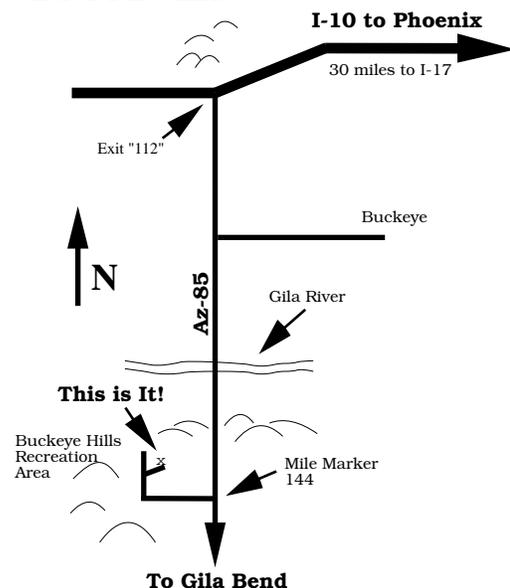
## Directions to SAC Events

**SAC General Meetings 7:30 PM at Grand Canyon University, Fleming Building, Room 105** — 1 mile west of Interstate 17 on Camelback Rd., north on 33rd Ave., second building on the right.



**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.

**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.

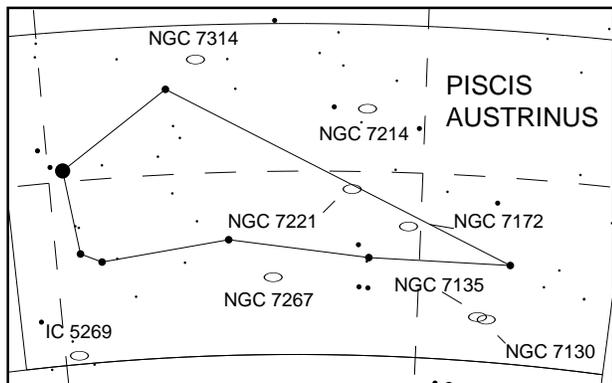


# What's Up

by Steve Coe

Piscis Austrinus October 1996

If you are observing galaxies in Pisces Austrinus, then it is probably getting chilly while you are observing. Time for a short discussion concerning dressing warm for astronomy. Because an observer is only standing still and moving around the telescope occasionally, astronomers are going to get chilled because they are



not moving around to generate body heat. Much of that heat will exit out the top of your head, so a stocking cap or hooded coat is essential. The other end of your body is also essential, so a pair of "Moon boots" and thick socks for your feet are needed. A.J. Crayon and I have each been wearing an insulated suit, like a snowmobile suit for years and find it very useful. I found some glove liners at the surplus store and they do very well for the coldest night, when fingers are chilly. Best tip: keep all this stuff together in one bag, so that you don't forget anything while going out to that distant observing site.

**NGC 7130** is pretty bright, small, round and brighter in the middle with an almost stellar nucleus at 135X with the 13"  $f/5.6$ . It is located at 21 hr 48.3 min and  $-34\ 57$  degrees.

**IC 5131** is within the 25 arcminute field of view of the previous galaxy, NGC 7130. I saw it as faint, pretty small, elongated 2 X 1 in PA 30 and brighter in the middle at 135X.

**NGC 7135** is at 21 hr 49.8 min and  $-34\ 53$ , close to the previous galaxies. At 11.7 mag, I see it as pretty bright, pretty large, elongated 1.5x1 in PA 45 and somewhat brighter in the middle at 100X. There a nice equatorial triangle of 10th mag stars on the west side.

**NGC 7172** Pretty faint, pretty small, elongated 2x1. There are two other pretty faint galaxies in the field and one very faint galaxy that I can only see with my head covered by a dark cloth. One of the other galaxies in this field is NGC 7174, it is pretty faint, small and round at 165X. Another is NGC 7176 it is faint, small and round with low surface brightness. Save this grouping for a dark site and a clear night. The position for NGC 7172 is 22 hr 02 min and  $-31\ 52$ .

**NGC 7214** is pretty faint, pretty large, irregularly round and has several stars superimposed at 165X. The nucleus was very bright but never stellar, see if you agree at 22 hr 09.1 min and  $-27\ 49$ .

**NGC 7221** is very faint, pretty small and round with a somewhat brighter middle at 100X. This galaxy has a very low surface brightness (13.3 mag) and higher powers makes it extremely tough to see. It is at 22 hr 11.3 min and  $-30\ 37$ .

**NGC 7267** is at 22 hr 24.3 min and  $-33\ 41$ . I saw it as pretty bright, pretty small, elongated 2x1 in PA 90 and much brighter in the middle at 100X. There is a very nice triple star on the south side with one star light yellow star and two blue companions.

**NGC 7314** is a beautiful edge-on galaxy at 22 hr 35.8 min and  $-26\ 03$ . I see it as pretty bright, pretty large, somewhat brighter in the middle and elongated 4x1 in PA 0 at 100X. This nice galaxy has a companion to the south which is faint, small and round.

**IC 5269** is another spindle-shaped galaxy, about one magnitude fainter than NGC 7314. I see it as pretty faint, pretty small, elongated 2x1 in PA 30 and somewhat brighter in the middle at 135X. In my opinion, an observer needs to spend some time doing the lesser objects around the sky to appreciate a showpiece.

Magellan, in 1519, reported the sighting of the Large and Small Magellanic Clouds. This brought the number of reported deep-sky objects to 11, although Al Sufi's work was not generally known at the time before Galileo introduced the telescope into astronomy in 1609. At this event, Galileo revealed that Praesepe (M44) was not a nebula but a star cluster.

**Nicholas-Claude Fabri de Peiresc** (1580–1637) was the first to discover a true gaseous nebula, the M42, in 1610. This was also the first deep-sky discovery with a telescope. Shortly after this, in 1612, Simon Marius (1570–1624) found (independently re-discovered) the Andromeda Galaxy (then called the Andromeda Nebula, M31). M42 was independently found by the Jesuit astronomer Cysatus (1588–1657) in 1618.

Long forgotten and only rediscovered in the early

1980's (published by Serio, Indorato, and Nastasi in the *Journal of the History of Astronomy*, No. 45 (February 1985) and No. 50 (August 1986)), **Giovanni Batista Hodierna** (1597–1660), astronomer at the court of the Duke of Montechiaro, compiled a catalog of some 40 entries, including 19 real nebulous objects, found with a simple Galilean refractor with a magnification of 20, and printed in Palermo in 1654. Included is an independent rediscovery of the Andromeda Nebula (M31), and at least 9 (probably 10) true discoveries: M6, M36, M37, M38, M41, M47, NGC 2362, NGC 6231, NGC 6530 (the cluster associated with the Lagoon Nebula M8) and (possibly) NGC 2451.

**Johan Hevel** or **Hevelke** (also known as **Hevelius**, 1611–87) from Dantzic compiled a catalogue of 1564 stars, *Prodomus Astronomiae*, published posthumously together

# The 15th Annual All-Arizona Star Party

## October 11–12, 1996

This is the fifteenth annual All-Arizona Star Party. It is a two night event, held during the new moon of October. This year's event is once again sponsored by the East Valley Astronomy Club (EVAC). In the past, this event has been sponsored by other Arizona clubs.

The star party take place at a site south Arizona City, which is almost equal distant (about 55 miles) from Phoenix and Tucson (see the map). The site is remote and very dark. The only facilities available will be a port-a-pottie.

Staying the night means you have to plan ahead. The desert tends to be hot and sunny during the day

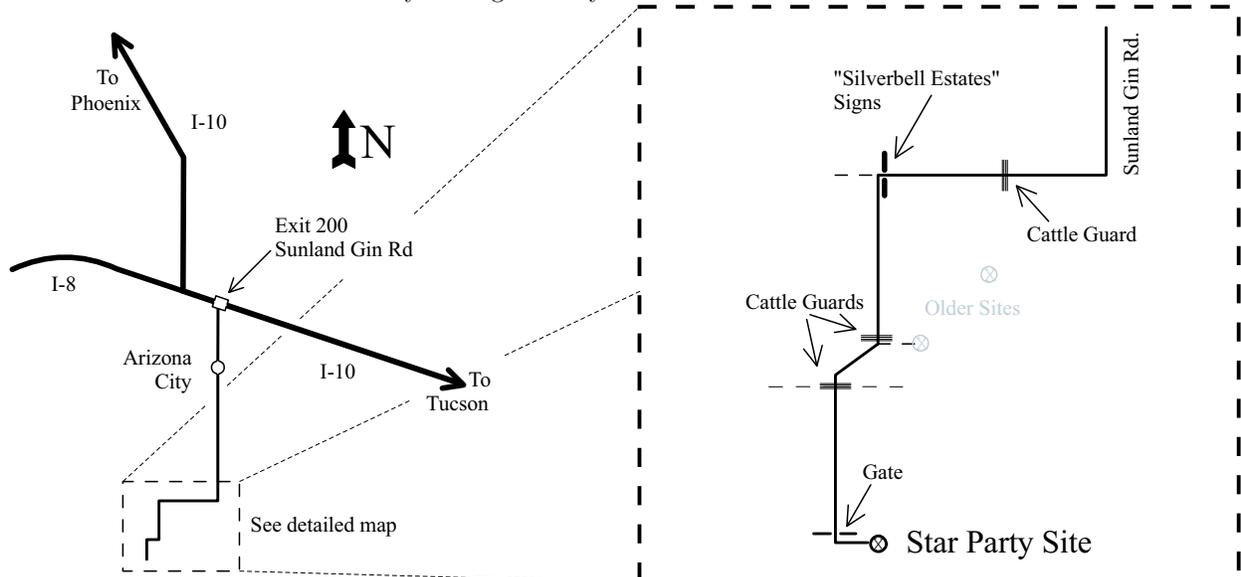
and cold at night. Plan accordingly. Remember to bring warm clothes, food, and drinks. It's best to bring too many warm clothes than too few.

All Arizona astronomy clubs are invited and it's hoped for a large turn-out. Last year there were 62 vehicles on the observing field on Saturday night. So plan on being there early to see old friends and making new ones. Last year, both nights were very good night for observing.

### Swap Meet

On the Saturday afternoon, October 12, there will be a swap meeting at the site from **4 PM until sunset**. Bring money to buy or things to sell or trade.

For those staying both nights, here are a list of restaurants at the given I-10 exits: **194** — Dairy Queen, Burger King, Denny's, **198** — Wendy's, **200** — Iron Skillet, Subway, Burger King, **203** — Pizza Hut, McDonald's, Taco Bell, Waffle House, and Mexican Food.



Take I-10 to exit 200 (Sunland Gin Road.) Turn right (south) after exiting the freeway. After about 15 miles, the pavement ends and about one mile further, the road turns sharply to the west. After another four miles, the main road will turn south just after the "Silverbell Estates" signs. Three miles past the signs, the road will veer off to the west, and five miles further, the road will pass through a gate. Turn left after the gate and continue for another 1/4 mile to the site.

with his star atlas, *Uranographia*. He included a list of 16 entries, 2 of which are objects (the Andromeda Galaxy (M31) and the Praesepe star cluster (M44)), while the other 14 are asterisms or non-existent. Derham and Messier spent a lot of observing time to find these "nebulae"; among them is a double star in Ursa Major, which Messier believed he identified (it is M40) — we now know that he probably found another double star than Hevelius. Hevelius is also thought to have first seen M22, but the discovery of this first known globular cluster was generally assigned to **Abraham Ihle** in 1665.

In his star catalog *Historia Coelestis Britannica*, published in 1712 and revised in 1725, **John Flamsteed** (1646–1719) refers to several "nebulae" and "nebulous

stars." This includes many of the then-known objects (Coma Cluster Mel 111, Double Cluster, M31, M42) plus three independent discoveries, including re-discoveries of unknown Hodierna objects NGC 6530 (associated with M8) and M41 and his own true original discovery of NGC 2244 around the star 12 Monocerotis (associated with the Rosette Nebula NGC 2237–9, neither the cluster nor the nebula in Messier's catalog).

**Gottfried Kirch** (1639–1710), who was observing from Berlin, and known for his observations of stars and comets, discovered M11 in 1681 and M5 in 1702.

**Edmond Halley** (1656–1742) published a list of six "luminous spots or patches" in the *Philosophical Transactions* of the Royal Society for 1715, including his own dis-

coveries of globular clusters Omega Centauri (on a journey to St. Helena in 1677) and M13 (1714), and the previously known objects M42, M31, M22, and M11.

**Jean-Jacques Dortous de Mairan** (1678–1771), before 1731, found a nebulosity around a star north of the Great Orion Nebula, which became known as M43 (this was published 1733). Shortly after this, **John Bevis** (1695–1771) discovered the Crab Nebula M1. He created a star atlas, which he called *Uranographia Britannica*, which was completed in 1750, but due to the bankrupt of the publisher, only one or two printings were produced, and the complimentary catalog was never published. Messier must have had access to a copy of this atlas, as he refers to the “*English Atlas*” several times, e.g. in the descriptions for the objects M1, M11, M13, M22, M31, and M35. Oddly, the discovery of M35 is ascribed to de Cheseaux in 1746 by Kenneth Glyn Jones, although it seems that Bevis might have seen it earlier, as it was in his atlas.

**William Derham** (1657–1735) published a list of 16 nebulous objects in the *Philosophical Transactions* of the Royal Society for 1733, 14 of them being from Hevelius’ catalog, and the other two from Halley’s list. Only two of the objects were real, M31 and M7, all others were nonexistent, or uninteresting asterisms, fooling other observers (including Messier) using this widespread compilation; it was reprinted in the *Memoirs* of the French Academy of Sciences in 1734, and included in de Maupertius’ book *Discours sur la Figure des Astres* in 1742.

About 1746, **Philippe de Cheseaux** (1718–51) observed several clusters and “nebulous stars”, and compiled a catalog of their positions. According to Kenneth Glyn Jones, 6 of them were original discoveries: M16 (No. 4), M25 (No. 5), M35 (No. 12, but see the remark at John Bevis), M71 (No. 13), M4 (No. 19), and M17 (No. 20). Moreover, he independently re-discovered M6 (No. 1) and M22 (No. 17). De Cheseaux’s list was given to Reaumur, who presented it to the French Academy of Sciences on August 6, 1746, but it was not otherwise published. It was investigated by Bigoudan in 1884 and became more well known only then. Besides observing nebulous patches in the sky, de Cheseaux was probably the first to formulate *Olbers’ paradox*.

**Jean-Dominique Maraldi** (1709–88), also known as **Maraldi II**, discovered two globular clusters: M15 on September 7, 1746, and M2 on September 11, 1746.

**Le Gentil** (with his full name **Guillaume-Joseph-Hyacinthe-Jean-Baptiste Le Gentil de la Galaziere**, 1725–92) discovered M32, the Andromeda Galaxy’s companion, on October 29, 1749. He also discovered the gaseous nebula M8, the Lagoon Nebula, in the same year (the cluster had been found previously by Flamsteed, see above.) He independently found Hodierna’s objects M36 and M38.

**Abbe Nicholas Louis de la Caille** (Lacaille, 1713–62) observed stars and deep-sky objects in the southern sky from South Africa, and compiled a catalog of southern deep-sky objects with 42 entries, 34 of which are real.

Among them are 26 original and at least two independent rediscoveries.

This was the last discovery in the deep-sky before **Charles Messier** (1730–1817) started compiling his catalog, and made his first original discovery of M3 in 1764. For more than a decade, Charles Messier was alone in looking for clusters and nebulous objects. During that time, he discovered 27 objects of which 25 are actually deep-sky objects (the other two are the Sagittarius star cloud M24 and the double star M40).

Messier himself originally discovered 15 more nebulous objects (14 deep-sky plus the star quartet M73) in the subsequent years until 1781.

In late 1774, **Johan Elert Bode** (1747–1826) joined those who looked for new nebulous objects with success: He discovered M81 and M82 on the last day of that year (December 31), and 3 more objects are subsequently quoted to him (M53 in 1775, M92 in 1777, and M64 in 1779). Bode compiled a deep-sky catalog of 75 entries published 1777 in the *Astronomisches Jahrbuch* for 1779, and entitled “A Complete Catalogue of hitherto observed Nebulous Stars and Star Clusters.” However, according to Kenneth Glyn Jones, this list was inflated by a lot of nonexistent objects and asterisms gathered from Hevelius and elsewhere; it contains at most 50 real objects. The second edition, which was extended by his two latest original discoveries of M92 and M64, was published in 1780.

About five years later, in 1779, when Messier and Bode were still active in compiling their lists, four more astronomers entered the “club” of successful deep-sky discoverers: **Antoine Darquier de Pellepoix** (**Darquier**, 1718–1802) of Toulouse discovered the Ring Nebula (M57) in January, shortly before Messier; both found it when tracing a comet. **Johann Gottfried Koehler** (or **Köhler**, 1745–1801), who had independently found M81 and M82 in the time between 1772 and 1778 (so maybe he did it before Bode), had discovered M67 this year or perhaps earlier, and found M59 and M60 on April 11, 1779, when tracing comet Bode 1779. While Messier found, in addition, M58 on that occasion, it was **Barnabus Oriani** (1752–1832) who first discovered M61. Koehler published a catalog of 20 entries in 1780. Finally, Messier’s friend **Pierre Mechain** (1744–1804) began his astronomical observing career, and made his first original discovery of M63 on June 14, 1779. Subsequently, Mechain discovered originally about 27 objects most of which he contributed to Messier’s catalog, as he was observing in close cooperation with Charles Messier. As he surely has communicated all his discoveries to Messier, Helen Sawyer-Hogg, in 1947, decided to add three more of them to the Messier catalog (M105 to M107).

As a major milestone in deep-sky discovery, the Messier catalog was published in its final version of 103 objects in 1781 in the *Connaissance des Temps* for 1784. Together with its more recent additions which brought it to 110 entries, which at least all but one (M102) belong to real objects (though four of them were missed for over a

century), it contains the majority of all clusters, nebulae, and galaxies known up to April, 1782 (when M107 was the last Messier object to be discovered, by Pierre Mechain).

The Messier catalog did in particular impress the great German-British astronomer **Friedrich Wilhelm (William) Herschel** (1738–1822), who by that time had become famous especially because of his discovery of planet Uranus in 1781. Herschel received his copy of Messier's catalog from a friend, William Watson, on December 7, 1781. At that time, he was still working as organist at Bath (which he gave up in May, 1782), and a skilled telescope maker. He started an extensive scan of the skies he could observe from England (i.e., the northern sky), with large telescopes of up to a 48-inch aperture, 40-foot focal length giant which he set up himself on August 28, 1789 (on that first day he discovered Saturn's moon Enceladus with this new scope). Published in 3 steps, Herschel cataloged 2500 discoveries, most of which are real deep-sky objects. As he had the best telescope of that time, he was without competition. He was assisted by his sister **Caroline Lucretia Herschel** (1750–1848) who was an avid observer herself; she discovered a lot of the clusters and nebulae in Herschel's catalog (among them is an independent discovery of M 110 = H V 18, which Messier had discovered but not cataloged 10 years earlier), and discovered 8 comets.

William Herschel classified the nebulous objects in eight groups:

1. Bright Nebulae
2. Faint Nebulae
3. Very faint Nebulae
4. Planetary Nebulae
5. Very large Nebulae
6. Very compressed and rich star clusters
7. Compressed clusters of small and large (i.e., faint and bright) stars
8. Coarsely scattered clusters of stars

As the true nature of the objects was still unknown, these classifications are now only of historical importance.

William (and Caroline) Herschel had virtually exhausted the northern skies with object discoveries around 1800. But the southern sky was still waiting to be explored, and it was **James Dunlop** (1795–1848) who made

the first major observations there after Lacaille. He went to New South Wales, Australia, in 1821, accompanying a Sir Thomas Makdougall Brisbane. He was keeper of the Brisbane observatory at Paramatta, 1823–1827, and compiled a star catalog (the *Brisbane Catalogue* of over 7000 southern stars). His observations of deep-sky objects from that time were compiled into "A Catalogue of Nebulae and Clusters of Stars in the Southern Hemisphere observed in New South Wales" of about 600 discovery entries. This catalog was sent to William Herschel's son, John Herschel, who presented it to the Royal Society in 1827. Dunlop was awarded for this work with the Gold Medal of the Royal Astronomical Society, and with Lalande Medal of the French Academy. However, this did not prevent a lot of his "objects" to be nonexistent, or so badly described that they couldn't be safely identified later: Hardly half his entries can be related to real objects.

**John Frederick William (John) Herschel** (1792–1871) had continued his father's work, and added 525 new entries (northern objects) in a catalog published in 1833. But John Herschel also wanted to catalog the southern skies. On November 13, 1833, he and his family went on ship to sail to the Cape of Good Hope, South Africa, where they arrived on March 4, 1834. He intensively studied the southern skies in the subsequent years. His observations of southern nebulous objects were published in 1847 as a catalog with 1713 entries. Evidently, he summarized his and his father's, as well as others' deep-sky discoveries in his great *General Catalogue* of over 5000 entries.

The work of the Herschel's finally brought the great "nebula" (and cluster) discovery time to a conclusion. Nevertheless, it took time and new research methods (especially photography and spectroscopy), until the nature of the various deep-sky objects was uncovered: The gaseous nature of the "true" nebulae was discovered by the British amateur and pioneer of spectroscopy **William Huggins** (1824–1910) in the late 19th century, while only in the 1920's the true nature of galaxies as independent "island universes" like our Milky Way became apparent (due to the work of **Edwin Hubble** (1889–1953)).

#### References:

- \* **Kenneth Glyn Jones**. *Messier's Nebulae and Star Clusters*. Faber & Faber, 1968. The 2nd re-

## 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. All insertions must be submitted in writing.

**For Sale** — Meade 10" Dobsonian, only 18 months old and hardly used. Purchased for \$800+, but willing to sell for \$400 firm. If interested, please contact Wade Klinger at 937-9079.

**For Sale** — HP-95 Palmtop Computer, \$275. Runs 20 hours on two AA batteries. It has an editor, calendar, filer, calculator, and Lotus 1-2-3 spreadsheet. It will interface to personal computer and runs MS-DOS programs. Comes with 2 MB RAM card, manual, interface hardware, and AC adapter. Great for taking notes at the scope. Steve Coe, 789-7786.

vised edition is Volume 2 of the *Practical Astronomy Handbooks* series, published by Cambridge University Press, 1991.

\* **Gudrun Wolfschmidt.** *Milchstraße, Nebel, Galaxien: Strukturen im Kosmos von Herschel bis Hubble* (Milky Way, Nebulae, Galaxies: Structures in Cosmos from Herschel to Hubble). Deutsches Museum, München 1995

\* **Curtis A. Deer.** "A History of the Study of Planetary Nebulae and Basic Models of Their Formation." *Electronic Journal of the Astronomical Society of the Atlantic (EJASA)*, Volume 5, Number 7 (February 1994).

Thanks to Glen Cozens for communicating some accurate data on James Dunlop.

## A Magical Evening by Steve Coe

Saturday, September 7, 1996

It certainly didn't look like it was going to be a great night under the stars, but A.J. and I were going out anyway! Clouds had built up all afternoon and it did not look good in the direction of the site for the Saguro Astronomy Club Star Party, near Buckeye, Arizona. But, like I said, A.J. and I were going anyway. With A.J.'s trusty 8 inch in his van and my 6" Rich Field Telescope (RFT) in the truck we got on the freeway and passed the time on the CB radio talking about computers, telescopes and plans for next weekend, when the Moon is New.

Arriving at the site, we find that two other club members have also decided to try their luck. As we munch on a sandwich, Jack Jones and Pierre Schwaar pull in. I set out the 6" as a sacrifice, if you don't set up a scope the clouds won't know that it is time to clear off. I find Alberio peeking through a small hole and we all comment it is the worst we have ever seen the colors of this famous double star. As it gets dark Rich Walker wheels his new truck next to mine and now we have seven, a number with magical powers. Like witches trying to cast a spell to make the clouds disappear, we sit in a circle and discuss a wide variety of subjects: space programs, Galileo Project, Hubble Space Telescope, eyepieces, new films for astrophotography and observing sites for New Moon Weekend.

As Pierre swings his little RFT toward the West, a little clear sky starts to appear, we can see Jupiter. After Pierre mentions that he can see some detail on the planet, a few other folks start to get set up and I put an eyepiece in the 6". Jupiter is mushy, but getting better and as I look away from the eyepiece, the western horizon is starting to clear off. Time to get out the trusty binoculars to look for Comet Hale-Bopp. It is seen in the binocs, even with a light cloud cover and I point the 6" at it easily with the Telrad. The bizarre geometry that I have been seeing for weeks is evident right away, even at only 60X. The bright core has a bright wedge of material coming off it toward

the North, but the tail is 90 degrees to this bright region. A unique brightness contour for any comet I have ever seen.

As the evening progresses I make my way through a short observing list I have prepared. The Coathanger (Col 399) in Vulpecula is very nice. Using a 38mm Erfle eyepiece that gives a two degree field in the 6", I can fit the entire Coathanger pattern in the scope and I count 38 stars in the cluster, which is not compressed, but has many bright stars. The North America nebula is excellent as the clouds have really gone away now and the Summer Milky Way is very nice. With a 22mm Panoptic eyepiece and a UHC filter, I can easily see the Mexico and Florida sections and the Pelican is somewhat faint, but it is there with direct vision.

Going over to visit with Rich Walker, we spend some time on Saturn at 220X. Cassini's Division is seen often in his 13" f/5 and there are three pretty faint satellites just off the tip of the rings. A quite good view, taking into account that an hour ago, we were just hoping for a hole in the clouds to steal a quick glimpse.

A.J. and I tear down about 1 o'clock and make our way back to our homes. I find I cannot sleep and after watching the late movie on Harry Houdini I step outside to see if the clouds have decided to stay away. It has become a sparkling clear night and at nearly 5 o'clock a lovely Crescent Moon is in conjunction with Venus and Mars. The Earthshine is obvious, cradled in the arms of the Moon and I decide to roll out my 10" for a closer look.

Venus is about 50% illuminated and its beauty was best seen naked eye. I make my way over to Mars and it is a tiny ball, but at 300X in the 10" f/6 I can just make out a small dark marking on the gibbous planet. Swinging over to the Moon shows me that several excellent features are near the terminator and lots of fine detail is seen using powers from 200X to 300X. Vallis Schröteri is a snake winding its way out from crater Herodotus. Aristarchus is a crater with a very detailed floor and a prominent central peak. Both of these craters show places in the walls where material has slumped down in centuries past.

All in all, a truly magical night and one that got me back in contact with the reasons that I love to look at the sky. I enjoyed every kind of viewing on this night: low power Milky Way scanning, the naked eye beauty of the heavens, trying a variety of magnifications and filters on several deep sky objects and a high power look at the Moon and planets. Quite a memorable night. But, it is night no longer. The Sun has risen, the day is heating up and I am going to try and catch up on my sleep. Good-night.

## Newsletter Deadline

Mail items for Such-a-Deal at least two weeks before the end of the month. Articles that need to be published in a timely fashion must be submitted or the newsletter editor notified of the article at least 6 weeks before month

they are published. Items arriving too late for an issue will be included in the next newsletter.

## Bits and Pieces

### Minutes from the August Meeting

The August meeting was called to order at 7:30 by Gerry Rattley.

Gerry mentioned the Lunar eclipse on Sept. 26th. When it rises it will be at first contact, so it could be an interesting object to view.

Regina Lawless gave the Treasurers Report.

There will be a board meeting before the next Deep Sky Group meeting.

A.J. Crayon talked about the Deep-Sky Group meeting which will cover Delphinus and Ophiuchus. He also discussed the different SAC awards that can be earned. Brian Workman was awarded his telescope plaque for doing the Messier List.

Paul Dickson told us that the the fourth printing of the book *SAC's 110 Best of the NGC* is available for \$5 each. If you don't have one, get yours today.

Steve Coe talked for Rich Walker who couldn't be at the meeting. On Saturday night, Oct. 19, there will be a Public Star Party at Thunderbird Park. Please bring telescopes.

Gerry asked for any visitors to introduce themselves. We had 6 visitors at this meeting.

Steve opened up the Show and Tell. Chris Schur, Jim Crisman, and Paul Dickson all showed us slides. Pierre Schwaar showed us video he took of the Perseids.

There were about 40 people at the break.

After the break, Steve introduced Dan Matlaga who is the director of ASU's Planetarium. He talked about the origin of words. For example, the word east means to rise and west means to set. Very interesting talk, Dan.

Afterwards we adjourned to JB's for more astronomical discussions.

—David Fredericksen, SAC Secretary

### September Club Speaker

The speaker for the September club meeting will be Dr. David Burstein from A.S.U. His topic will be galaxy formation.

## Constitutional Changes

If you are a member of SAC, starting at the September meeting you will find copies of SAC's current constitution and proposed changes to it with your name on it. These changes will be voted on at the November SAC meeting.

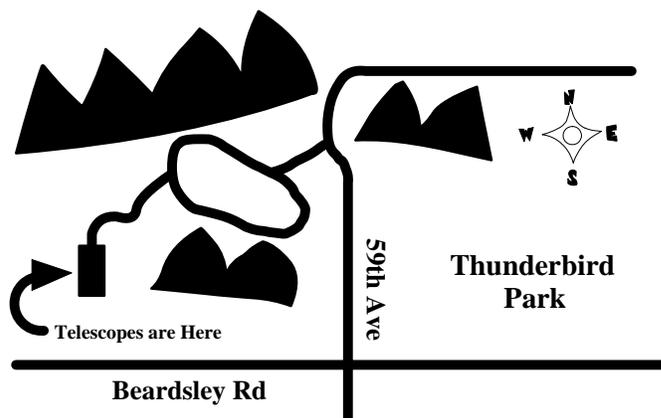
Please make an effort to pick up your copy at either the September or October meetings. Any copies remaining after the October meeting will be mailed. The consti-

tution is being handed out this way in an effort to save money on postage.

If there are any questions about these changes, please bring them up at one of the three meetings before voting. Paul Dickson is the chairman of the committee that's proposing these changes. The intent of the changes are to reflect how the Saguro Astronomy Club now operates. There are some areas that have changed in the past 15 years and other areas that were mentioned but never defined.

## Still Need Newsletter Articles

The article queue for this newsletter is still near empty and has been for quite awhile. With so few articles from which to pick, the newsletter editor has to spend more time and effort putting together the newsletter. This means he can't work on other things like the *Messier Logbook* (it's similar to the *SAC's 110 Best of the NGC*) or even articles for SACNEWS. Surprisingly enough, no articles have been turned down in 6 and a 1/2 years of publishing SACNEWS (but please don't try to be the first!)



## Public Star Party

Thunderbird Park  
Saturday, October 19

Sunset: 5:51 PM

Weather permitting, SAC is again providing telescopes for a public star party at Thunderbird Park on Saturday, October 19. If you are bringing a telescope, please try to be there and set up by 6 PM at the latest. Latest year, late arrivals had a LONG walk.

## Magazine Renewals Are Due!

It's time to renew your subscriptions to *Astronomy* and/or *Sky & Telescope*. To ease the paper work involved, please bring your renewal form or a mailing-label from your subscription.

# October 1996

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		Tomorrow Mercury at greatest elongation 17.9° (morning)	Friday Last Quarter Moon 5:06 A.M.	<b>PAS Meeting</b> Brophy Prep. Physics Lab	<b>TAAA Meeting</b> (Tucson)	<b>SAC Star Party</b> Buckeye Hills (members&guests)
		1	2	3	4	5
			<b>EVAC Meeting</b> (SCC: Rm. PS172)	Draconid Meteors Peak: All Night Z.H.R. Low 'til 1998	<b>Fri. &amp; Sat., Oct. 11-12: All-Arizona Star Party</b> Arizona City  <b>Saturday, Oct. 12: New Moon 7:14 A.M.</b>	
6	7	8	9	10	11	12
					Tomorrow First Quarter Moon 11:10 A.M.	<b>Public Star Party</b> Thunderbird Park
13	14	15	16	17	18	19
	Orionid Meteors Peak: After Moonset Z.H.R. 25				<b>SAC Meeting</b> Grand Canyon University, Fleming Rm. 105	Full Moon 7:11 A.M.
20	21	22	23	24	25	26
		Mars 1.1° of Regulus (morning)	Sun enters Libra 8 A.M.		<b>All Times are Mountain Standard Time</b>	
27	28	29	30	31		

## Magazines & Discounts

Club members may subscribe to astronomical magazines at reduced rates through the club Treasurer. See the Member Services Form on the back page of this newsletter. Furthermore, club members are encouraged to align their subscriptions with the Jan.-Dec. calendar year. This eases the burden both on the Treasurer and the Publisher by permitting a single Group Renewal to be placed in the autumn for the upcoming calendar year.

Those members who experience problems with their subscriptions to *Astronomy* magazine may call Kalmbach Publishing Customer Service at (800) 446-5489.

Those members who experience problems with their subscriptions to *Sky & Telescope* magazine may call Sky

Publishing at (800) 253-0245.

Besides the club discount on *Sky & Telescope* magazine, Sky Publishing offers club members a 10% discount on all other Sky publications. This means books, star atlases, observing aids, Spotlight prints, videos, globes, computer software, and more.

Club members who subscribe to *Sky & Telescope* through the Club Discount Plan may order Sky publications directly, at the above toll-free number, without going through the club Treasurer. Simply mention the Club Discount Plan and give the Saguaro Astronomy Club name to receive the discount. Sky Publishing will check their records to verify that you are eligible to receive the discount.

# Saguaro Astronomy Club Member Services Form

## Membership

Memberships are for the calendar year and are prorated as follows: Jan - Mar 100%, Apr - Jun 75%, Jul - Sep 50%, Oct - Dec 25%.

- \$28.....Individual Membership
- \$42.....Family Membership (one newsletter)
- \$100.....Business Membership (includes advertising)
- \$4.....Nametag for members
- \$14.....Newsletter Only

## Subscriptions

The following magazines are available to members. Subscribe or renew by paying the club treasurer. You will receive the discounted club rate only by allowing the club treasurer to renew your subscription.

- Sky & Telescope.....\$27.00 for one year
- Astronomy.....\$20.00 for one year

Write your name, address, phone number, and E-mail address in the space below.

Make checks payable to SAC.  
Mail the completed form to:

David Fredericksen  
SAC Secretary  
6222 W Desert Hills Dr  
Glendale AZ 85304

## SAC and SAC Meetings

**Saguaro Astronomy Club (SAC)** was formed in 1977 to promote fellowship and the exchange of scientific information among its members — amateur astronomers. SAC meets monthly for both general meetings and star parties, and regularly conducts and supports public programs on astronomy.

SAC meetings are usually held on the Friday nearest the full moon. This means that over the course of the year, meetings are not held on the same week of the month. The same is true of the club's star parties. Star parties at Buckeye Hills Recreation Area are mostly held on the Saturday of the third quarter moon.

**SAC General Meetings:** 7:30 PM at Grand Canyon University, Fleming Building, room 105 — one mile west of Interstate 17 on Camelback Rd, north on 33rd Ave., second building on the right. See inside for a map to the meeting location.

### 1996 SAC Meetings

- Jul. 26
- Aug. 30
- Sep. 27
- Oct. 25
- Nov. 22
- Dec. 14 Party

### 1997 SAC Meetings

- Jan. 24
- Feb. 21
- Mar. 21
- Apr. 25
- May 16
- Jun. 20

### 1996 SAC Star Parties

Date	Sunset	Moonrise
Jul. 6	7:43PM	11:57PM
Aug. 10	7:16PM	4:46AM
Sep. 7	6:43PM	2:26AM
Oct. 5	6:06PM	1:11AM
Nov. 2	5:35PM	11:54PM
Dec. 7	5:21PM	5:02AM

### 1997 SAC Star Parties

Date	Sunset	Moonrise
Jan. 4	5:37PM	3:50AM
Feb. 1	6:03PM	2:35AM
Mar. 1	6:28PM	1:23AM
May 31	7:34PM	3:01AM
Jun. 7	7:44PM	1:43AM

## SACNEWS

c/o Paul Dickson  
7714 N 36th Avenue  
Phoenix AZ 85051

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First Class Mail

### Inside:

- SAC Meeting — September 27
- Discovery History of the Deep-Sky Objects by Hartmut Frommert
- Dim Moments by Paul Dickson
- What's Up by Steve Coe
- A Magical Evening by Steve Coe
- All-Arizona Star Party — October 11-12
- Public Star Party — October 19
- SAC Meeting — October 30

**Magazine Renewals Are Due**