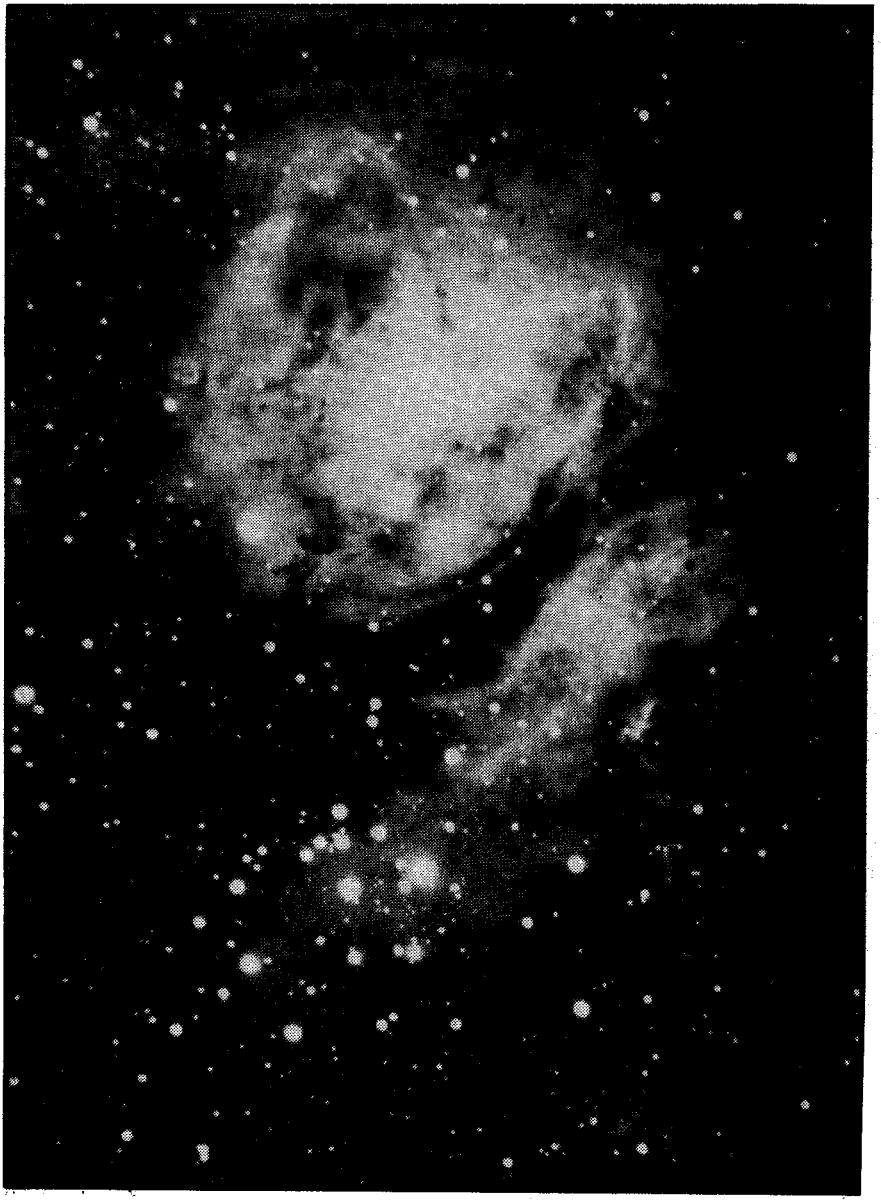
FEBRUARY '83

SJAA

EPHEMERIS



CALENDER

FEB 5 *Star-party, Henry Coe State Park lock comb. 4565

FEB 11 Board of Directors meeting, Bob Fingerhut, host 8:00 PM
(408) 263-4455

FEB 12 *Star-party, Fremont Peak State Park, Coulter Camp
new moon

FEB 19 General Meeting, NASA films 8:00 PM
rm 102, Alumni Science Center, University of Santa Clara

FEB 26 Indoor Star-party, Los Gatos Red Cross 7:30 PM
Don Machholz' preparation for the Messier Marathon
Public *Star-Party in the parking lot

FEB 27 Full moon

MAR 4 Board of Directors meeting, Gene Cisneros, host 8:00 PM

MAR 5 *Star-Party 3rd. qtr., Henry Coe State Park
lock combo 4565

MAR 11 1st night of the Messier Marathon, Loma Prieta
MAR 12 2nd night of the Messier Marathon, Loma Prieta

MAR 14 New moon

MAR 18 3rd night of the Messier Marathon
MAR 19 General Meeting , U of S.C.
Mar 19 4th night of the Messier Marathon (after the meeting)

MAR 26 Indoor Star-Party, Los Gatos Red Cross 7:30 PM

EPHEMERIS, is published monthly by the San Jose Astronomical Association. 3509 Calico Ave, San Jose, Ca. 95124 (408) 246-6189
All contributions are welcome and must be receiced by the 15th of the preceeding month. Please type to a width of 6.5", if this is not possible, handwritten contributions are welcome,
EPHEMERIS also welcomes your black and white photos of astronomical interest. 8x10 prints > 5x7 print min
All submissions may be sent to SJAA EPHEMERIS editor c/o Jack Zeiders 2961 Magliocco Dr #3, San Jose, Ca. 95128 (408) 246-6189

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BAY AREA ASTRONOMICAL AUCTION

April 30- Mark your calendar, check your wallet, and start digging around in your garage. why? Because that saturday has been reserved for the 3rd annual BAY AREA ASTRONOMICAL AUCTION.

This SJAA - sponsored event has grown every year, & this year should be bigger & better than ever before. That's why this early notice. Announcements of the auction will be sent out to all the northern California astronomy clubs and businesses, calling for early registration of items to be auctioned off. This is a great opportunity for all to clean out the garage, attic, and library and turn around for cash any astronomical item you no longer have use for. Telescopes, books, camera equipment, eyepieces, mirrors- you name it. It's all to be auctioned off by our expert auctioneer.

Last year over 150 items were bid on by almost a hundred bargain hunters. New and next to new items went at incredibly good prices - and a great time was had be all.

So look for future announcements in the SJAA Bulletin on how to pre-register items and bidd for great deals. we recommend pre-registration for larger more expensive items (like complete telescopes) in order to allow the SJAA to publish a pre-auction list that will be distributed throughout the Bay Area.

The auction will be held in the usual locale - the Los Gatos Red Cross building - all proceeds go to support the SJAA's actities in furthering amateur astronomy.

Denni Frerichs

OPPORTUNITIES

OBSERVE FROM MAUNA KEA

You are invited to observe and photograph from the splendid skies of Mauna Kea, Hawaii. For an idea of what this is like, please see my article in April 1982 ASTRONOMY, "The Magnificent Skies of Mauna Kea". I have received permission to again use the University of Hawaii 24" telescope on top of 13,000' high Mauna Kea during the dark moon period March 8-14, 1983. I extend an invitation to any serious observer or astrophotographer to join me on top of the mountain.

Costs (payable to University of Hawaii) are $43/day to stay at Hale Pohaku plus $25/day rental on a land rover to go up and down. I have a spare round-trip ticket available for $200.

Call me at (415) 443-7597 or write me at 891 Laguna St., Livermore, Cal. 94550

Jack Marling

COMET COMMENTS

In the last month of 1982 two more comets were picked-up, recoveries of two periodic comets. So 1982 closes out with 11 comet and discoveries, slightly fewer than the average for the past few years. One comet was an amateur discovery - Comet Austin in June. With the exception of this comet there have been no other amateur discoveries for over two years. Only three other comets were discovered in 1982, all three by a professional named Hartly of Australia while he was involved in other astronomical activity. Two were found on one photo and were later proved to be Comet DuToit, divided into two since it's last visit. Hartley's third discovery later was shown to be Comet Peters, also on an unexpected return trip. The remaining seven comets were recoveries of known returning comets, the most famous of which Halley's, being discovered Oct.16. §6

One comet remains visible in our skies, it's a dandy comet and I urge you to get out and see it soon. It's positions are given below. We also discuss in our "Past Discoveries" section, two comets discovered by William Bradfield in past Februarys.

Periodic Comet Tempel -1 (1982J): Recovered in Virgo, not far from M98, this comet was recorded as 19 mag. on Dec.11 it was picked-up by T. Seki in Japan. In the spring of 1983 it should be visible in amateur telescopes and remain so until August or Sept. It has an orbital period of 5.6 years and barely gets within Mars' orbit.

Periodic Comet Kopff (1982k): This comet was recovered on Dec. 20 by Barker and Odenwahn at the McDonald Observatory in Texas. It to was in Virgo, not far from Spica, and at mag 20. It has an orbital period of 6.6 years and should be visible in telescopes this summer.

Periodic Comet Churyumov-Gerasimenko (1982f)

DATE (00hr UT)	RA	DEC	MAG	
01-26	07:09.5	39 13	11.9	Moving away from both
02-05	07:13.0	38 05	12.4	the Earth & Sun, this
02-15	07:19.5	36 44	13.0	small comet is rapidly
02-25	07:28.5	35 17	13.4	getting fainter.

Past Discoveries: Comet Bradfield (1976a): Discovered by William Bradfield on thursday evening, Feb. 19, 1976, this comet could have been discovered from the U.S. before that date. Bradfield his 6-inch, f/5.5 refractor at 26 power to find this his fifth comet, he has since found six additional comets. The moon had just cleared out of the sky, being four days past full, and the comet was 55 degrees away from the sun.

The comet was at mag. 9.4 at discovery position 01:55.0, -37 17'. On Feb 1, with no moon in the sky, the comet was at 00:50 in R.A., with dec. at -39.5degrees, at mag.11.7. This would have placed it a few degrees above our southern horizon at evening twilight. South of our latitude it would have been even higher in the sky. Twenty days before that (Jan.11) the comet was at23:55,-42.0 mag. 11.7. This would have been faint for us but high enough in the sky to have been discoverable from the Southern Hemisphere. After discovery the comet moved north and was well visible to us.

Comet Bradfield (1978c): William Bradfield discovered this comet on Saturday morning, Feb.4, 1978. This was his seventh comet discovery. He had searched 360 hours since his previous discovery 3-3-76. At the time of discovery it was too far south for us to observe from this latitude, as it was during the pre-discovery days.

The discovery day was three days before new moon, the moon had just cleared the morning sky and this was probably the second morning since the moon left the area. The comet was at mag.8.0 at R.A. 18:21.2, Dec. -49 degrees56',51 degrees from the sun. thirty three days before the discovery the comet was 53 degrees from the sun at mag. 10.4 and R.A.14:51, Dec. -54 28'. On Dec.10, 1977 it passed two degrees S of Omega Centari at mag.11.8. Exactly it was picked up earlier we do not know. Southern Hemisphere observers had a couple of months when it was discoverable.

Don Machholz
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LUNAR ECLIPSE

The 1982 Dec. 30 lunar eclipse was seen in a cloudless sky here in San Jose, California. My own time was spent principally with occultation timings, that being my major interest, so I obtained only two crater timings.

I was able to obtain 20 occultation timings, my own record for a single night! Later, I found that Rick Baldridge, using an 18-inch and trained assistant, had done 60!!

As the partial phase progressed, I noted a slight blue edge on the advancing shadow, but no other color. My wife Florence joined me shortly before second contact, and commented, too, on the absence of any redness. She described that last moment before second contact as "looking like a diamond ring".

The contrast between the lighted and unlighted portions was stark.

With the onset of totality, the 4-1/4" at 15x showed a rich star field with a grey disk obstructing the center. Florence regarded the starry field as "well worth the cold and the hour", and soon went back inside!

At the eight inch, I timed several more occultations, noting the absence of color. The view very much resembled the unlighted limb I'm used to seeing when doing timings near new moon.

Stepping away at 11:31, just after mid-eclipse, I could not find the moon!Looking along the telescope I found it only by averted vision. A zero on the Danjon scale -- the darkest I'd ever seen. How does it compare to the 1963 eclipse, I wondered?

By 11:40 I noticed that the eastern limb was getting bright enough to interfere with occultations of the dimmer stars, and when I looked up at 11:54, I could again see the moon, albeit with some difficulty, by direct vision.

By 12:04 the moon was again a pretty crescent, and few stars could be seen surrounding it. The unlighted portion was nowhere to be seen, even with the eight inch.

I packed it in after my last occultation at 12:45 -- cold, tired, and hungry, but very amply rewarded for my troubles. What a grand spectacle!

Clear Skies,
Jim Van Nuland.

SPACE PROGRAM UPDATE

ASTRONAUT / CONGRESSMAN DIES - U.S. Rep.-elect John L. Swigert, Apollo 13 pilot, died on Dec. 27 of bone marrow cancer.

SIXTH SHUTTLE FLIGHT - The earliest possible launch date is late Feb. because of excess hydrogen found in the engine compartment after the flight readiness firing of the main engines last month. Another firing will be conducted to determine the location of the leak.

RUSSIAN NUCLEAR REACTOR SOON TO REENTER - Cosmos 1402, a Russian nuclear powered ocean surveillance spacecraft has malfunctioned & is expected to reenter the atmosphere between Jan. 23 and Jan. 25. The reactor was supposed be separated and fired into a safe, high altitude orbit, but is now tumbling out of control. The Russians say the reactor will completely burn up and therefore not be a safety problem.

MILITARY WEATHER SATELLITE ORBITED - The first of five Defense Meterological Satellite Program (DMSP) spacecraft was launched from Vandenberg Dec. 20 on an Atlas E booster. It is in a sun-synchronous orbit at an altitude of 450 miles.

IRAS LAUNCH SCHEDULED FOR JAN 25 - The Infared Astronomical Satellite (IRAS) is scheduled to be launched from Vandenberg at 6:15 P.M. Jan.25 on a Delta booster. The satellite, a joint project by the U.S., U.K., and the Netherlands, is designed to conduct an all sky survey in the infared. It is hoped that it will provide a map of one million infared sources in the universe.

1983 LAUNCH SCHEDULE - NASA has scheduled five shuttle flights and eighteen expendable launch vehicle flights for 1983. I will bring the schedule to the next Red Cross meeting so anyone may see it.

NASA'S FY'84 BUDGET - According to an unconfirmed source, a compromise has been reached with the Office of Management and Budget, (OMB) on the FY'84 budget. NASA will receive $100 million to begin the fifth shuttle orbiter (they requested $200 million) and the critical go-ahead. They also got the okay to initiate fabrication of a Venus Radar Mapper (VRM) spacecraft. This spacecraft will use many leftover Viking, Voyager and Galileo parts. Projects deleted by the OMB are the Teleoperator Manuvering System, the 30/20GHz demonstration satellite, the Upper Atmosphere Research Satellite (UARS), the Numeric Aerodynamic Simulator, and the tether system for the Tethered Satellite program (Italy is to provide the satellite).

Bob Fingerhut

EMPLOYMENT POSITION AT LUMICON

LUMICON is seeking a versitle individual, male or female, for a permanent position. Work will be varied and involve orders, inventory, record keeping, sales, typing, purchasing, and activities essential in day to day operation of a small business.

Beginning salary is $1000 per month and up, depending on prior experiences. Familiarity with astronomy would be helpful, but not essential.

Send your resume' to Dr. Jack Marling, c/o Lumicon, 2111 Research Drive,#5, Livermore, Cal. 94550 Tel. (415) 447-9570

WEATHER IN THE BAY AREA

What are the clearest months in the San Francisco Bay area? Which months are the cloudiest? How has the cloud cover varied through the year?

Below are my weather records for the past eight years, during which I recorded whether it was cloudy or not each night. This was done in conjunction with my comet hunting.

The figures for 1975 reflect once-a-night weather observation those after 1975 are for two observations per night -- one about two hours after sunset and again about two hours before sunrise. These figures are then divided by two for the number of cloudy nights. Any evening or morning in which I did some comet hunting was recorded as "clear", even if clouds came in a few hours later or the observations were cut short by clouds.

Before April 1976, I was in Concord, Calif., 50 miles NE of San Jose, and "cloudy" indicates foggy or cloudy weather. After that time the observations were made at Loma Prieta, in the Santa Cruz Mtns., at 3800 feet elevation. Here a foggy night in San Jose would be classified as "clear" if Loma Prieta was above the fog and there were no clouds above it. This happens about 10% of all nights, and occurs mostly, in the morning. Those times I went on vacation I took the logbook with me, but this has little effect overall accuracy.

Even a night labeled as "cloudy" may not be entirely useless for astronomical work. Planetary and Lunar observations can be done through the high thin clouds even though they may hamper comet hunting. On the other hand, a clear night may be degradedf by moonlight, high winds, or haze.

The number of cloudy nights per year varies (in part) due to my comet-hunting program changes. In my first four years I was observing 180-200 nights a year, those nights would be classified as "clear" even if clouds came in later. In the past four years a a partly-to-mostly cloudy night would be recorded as "cloudy".

Despite the varience in weather, I have still been able to get at least 5.5 hours of comet hunting in each month for the past eight years. (Two months were 8.0 hours and the rest were over 10.0 hours / month). If we keep our eyes on the weather we can always find an opportunity to observe the sky, it's merely a matter of dodging the clouds. After all, there far more clear than cloudy nights.

CLOUDY NIGHTS PER MONTH, 1975-1982

month	ave.	%	min/max
Jan	16.44	53.0	8.0-22.0
Feb	18.31	64.8	9.5-22.5
Mar	16.88	54.5	10.0-24.5
Apr	13.19	44.0	7.5-17.5
May	8.31	26.8	2.0-17.0
Jun	6.06	20.2	1.0-10.0
Jul	4.06	13.1	2.0- 7.0
Aug	6.13	19.8	2.0-10.5
Sep	7.56	25.2	2.0-12.5
Oct	10.50	33.9	4.0-20.0
Nov	13.75	45.8	5.5-20.5
Dec	13.25	42.7	5.0-20.0

CLOUDY NIGHTS PER YEAR

1975	101.0
1976	107.0
1977	123.0
1979	162.5
1980	147.0
1981	158.5
tot	1075.5

Don Machholz
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THE LAST GREAT LUNAR ECLIPSE OF '83

My son and I arrived at loma Prietta about 5:00 P.M., set up my Odyssey 1 (a lot of work there, you know) and then, after an abortive attempt to get the t.v. to work, laid out in the back of my truck for the long vigil.

Very quickly it became apparent that the moon wasn't going to allow any deep sky observing.

By midnight we were being vigorously attacked by the Brrrs. The wind had picked up to where it was rocking my truck (and telescope) quite a lot.

Bill Cooke and Jeff Horne arrived around 1:00. Jeff set up his 4.5" f5 on a Poncet mount built by their new company "Astrometals".

Reduction in moon light became apparent around 1:30, and the first nibble appeared at 1:48. Slowly, bit by bit, (or bite by bite) the moon began to disappear from sight. At approximately 3:38 the last portion of the moon was gobbled up by the earth's shadow. The whole process reversed itself shortly after 4:00.

Throughout the eclipse, Jeff Horne attempted to take photos of the event. Any exposures over 30 seconds will probably not turn out because of the Gusties which frequently attacked our telescopes.

Shortly after 4:00, Bill and Jeff gave up the battle of the Brrrs and Gusties, packed up and left for warmer places. I remained, zipped up in my sleeping bag in the back of the truck, watched the rest of the event untill 5:00, then I too packed up and slowly crept down the mountain for home.

All night long the sky was very clear, and after the moon was fully eclipsed, the stars at the periphery of the moon gave it a 3D effect.

I had planned on doing some deep sky observing that night, but the Gusties kept rocking my scope so much that, I gave it up as a lost cause.

Tom Ahl

MY FAVORITE NON-MESSIER GALAXIES

All of the Messier galaxies are fairly bright and with a little experience it is not too difficult a task to find them all in as small as a four-inch scope (though I and several others that I know of have seen them all in a 60mm refractor). There are in our night skies several galaxies which are comparable with most of the Messier galaxies and are well worth the trouble to look for. The following list contains those galaxies which are my favorites among those which are beyond the Messier objects. In this list I give only the galaxies NGC number and a short discription of why it is in the list along with some observing tips and notes on the individual object. If you need information on magnitude, size or co-ordinates I will refer you to Burnham's

Celestial Handbook (all of these galaxies are in it). I will point out from time to time that a certain object is best seen in "dark skies with larger apertures". This comment actually applies to any of these objects, but if it is mentioned specifically for any object, it means that the object will show a wealth of detail under these conditions. My criteria for selecting the objects in this list were magnitude (brighter than 10.0 visual in the Skalnate Pleso), size (larger than 10' in the Skalnate Pleso) or favoritism (whatever I like, explained in the text with the object).

NGC 45 is large but faint. It is also a little far south and is often overlooked because of its brighter neighbor, NGC 253.

NGC 55 is very large and very bright. It is very elongated in an east-west direction and appears to have two parts. It is a little far south, but it is well worth the trouble to find.

NGC 147, NGC 185 and NGC 278 are three small elliptical galaxies located south of the "W" of Cassiopeia. NGC 147 and NGC 185 are both nearby dwarf ellipticals and are believed to be members of our Local Group of Galaxies.

NGC 205 is also known today as Messier 110 (not everyone accepts this position in the Messier catalogue though). It is the north preceding companion galaxy to the Great Nebula of Andromeda.

NGC 247 is very large but has a very low surface brightness. It shows a wealth of detail under dark skies with larger telescopes.

NGC 253 is one of the finest showpieces in the sky. It is large, it is bright and it shows detail in almost any scope in almost any sky condition. It is visable in 50mm binoculars.

NGC 300 is a very large broadside spiral. It has a very low surface brightness and is pretty far south making it a little hard to observe; but it is worth a look anyway.

NGC 404 is in the same moderate power eyepiece field (100-150x) as Beta Andromedae. It is a visual treat to see this tiny fuzz-ball so close to a dazzling reddish star.

NGC 772 is a fine broadside spiral galaxy in Aries. Try it on a dark night with a large aperture. It has a bright northern arm and an extremely faint southern arm.

NGC 891 is a beautiful edge-on spiral. It is a little faint but set into a star studded field as it is makes it a visual delight. With dark skies and moderate apertures the central dust lane is not too difficult to observe.

NGC 1300 is one of the largest, brightest barred spirals in the sky. It is the only barred spiral that I have observed as a barred spiral. With John Dobson's 24-inch at Fremont Peak I saw this galaxy as a very distinct "Z" structure. If anyone knows of any other barred spirals that are easy to observe as such, I would certainly like to know of them.

NGC 1365 is the brightest member of the Fornax Galaxy Cluster. The Tirion Atlas plots about a dozen galaxies within a two degree circle here centered on RA 3hr 35min, dec -35deg (year 2000 co-ordinates). This is a great area to see how many galaxies you can get in your field at one time.

NGC 2403 is a large, bright, almost broadside spiral. It is set into a star studded field of moderately bright stars which are sprinkled and embedded over it in such a way that to me this galaxy appears as a diamond-studded broach pin.

NGC 2683 is a large, bright, almost edge-on spiral. I haven't looked at this one recently and I don't recall anything outstanding about it.

NGC 2841 is a large, tilted spiral. Photographs show it to have many thin spiral arms. In a moderate size scope it gradual-

ly tapers off from a bright core to the blackness of space.

NGC 2903 is large and bright and is not too difficult to locate as it is right under Leo's nose. This highly tilted spiral shows a wealth of detail in dark skies with large scopes.

NGC 3109 is a large irregular galaxy located down in Hydra. I have not viewed this object in several years.

NGC 3115 is one of my absolute favorites. It is bright, large and shows quite a bit of detail for an elliptical system. It is football or saucer shaped and has fuzzy wings when viewed in larger instruments.

NGC 3379, NGC 3384 and NGC 3389 are located in Leo. NGC 3379 is Messier 105. I have mentioned it in this list because it has two NGC companions which one cannot help but observe whenever one looks at it. The three form a triangle in the eyepiece with the brightest being the Messier object. NGC 3384 is the next brightest and is to the east (following) the Messier object. The faintest of the three is NGC 3389.

NGC 3521 is in Leo. It is bright enough to be included in this list though I have not observed it in years.

NGC 3628 is a very large edge-on spiral located just north of M65 and M66 in Leo. It is a little faint but dark skies will reveal a lot of detail even in moderate instruments. Look for the large central dust lane.

NGC 4236 is very large but it is also very faint. It appears as a thin lane of cloudiness extending across your low power field. It can only be seen from dark sky sites. I have seen it from Fremont Peak in an 8-inch before. This one offers a real challenge to your observing skills.

NGC 4244 is large but faint. I have not viewed this one in recent years but it seems interesting. It is a very elongated system. It is an edge-on spiral. It's photo in the Hubble Atlas does not show it to have a prominent dark dust lane.

NGC 4449 is a bright irregular galaxy in Canes Venatici. It is a little squarish and appears to be a Magellanic Cloud type of system.

NGC 4374 (M84), NGC 4388, NGC 4406 (M86), NGC 4435, NGC 4438, NGC 4461, NGC 4473, NGC 4477, NGC 4459 and NGC 4474 form a chain of galaxies in the heart of the Coma-Virgo realm of nebulae. It is fun to sweep this region with low power.

NGC 4548 is nowadays considered to be Messier 91. It is fairly bright and fairly large. It is not too difficult to locate as it is just following Messier 88 about two-thirds of a degree. This is a nearly broadside barred spiral.

NGC 4559 is a large, fairly bright, almost broadside spiral. I usually stumble onto it when I am searching for NGC 4565.

NGC 4565 is a very beautiful edge-on spiral. It is large, bright and has a very distinct central dust lane. Because it is very elongated and is located in Coma Berenices, it has been nicknamed Berenices' Hair-clip.

NGC 4631 is very large, bright and very elongated. Even though it is classified as a spiral, it has no trace of a central dust lane. It also has no concentrated central core. To me this galaxy looks like a slug. It has a nearby companion galaxy, NGC 4627, to the north.

NGC 4656/7 is a very large irregular system. It is very elongated and the small detached portion on the north following end is NGC 4657.

NGC 4697 is small but fairly bright. I have not viewed this one in the last few years.

NGC 4699 is a broadside multiarmed spiral in Virgo. I have not observed it recently.

NGC 4725 is a large, bright, nearly broadside spiral in Coma Berenices. I have not viewed this one in many years.

My Favorite Non-Messier Galaxies, continued

NGC 5005 in Canes Venatici is quite bright but is not large. It is not to far north preceding from NGC 5033. I have not observed this one in many years.

NGC 5033 is south following NGC 5005. It is larger but a little bit fainter than its neighbor. I have not viewed this one in several years.

NGC 5128 is very large but has a low surface brightness. It is bright enough for small and moderate scopes though and it shows some detail such as a broad central dark lane dividing it into two pieces. This one is a little far south but is well worth a look.

NGC 5195 is the small, but bright, galaxy attached to the north following arm of Messier 51, the Whirlpool Nebula. It is visable in even small instruments, but moderate to large apertures will show the connecting bridge between the two colliding galaxies.

NGC 5253 is not large and only fairly bright but it is a favorite of mine because back in 1972 I observed a supernova of 8th magnitude in it. This is the second supernova this galaxy has had within a century.

NGC 5322 is a small but bright elliptical galaxy located above the handle of the Big Dipper. It is only a round fuzz ball but I always like to look at it. It looks like a distant unresolved globular star cluster.

NGC 5866 is sometimes accepted as Messier 102 even though it cannot be (Mechain himself admits that M102 was a mistaken reobservation of M101). This is a football shaped elliptical system with a small star superimposed on its north preceding tip. It is small but it is quite bright.

NGC 5907 is a long thin streak. It is an edge-on spiral. I do not remember seeing the central dust lane on this one. It would be interesting to see how much detail can be seen with a large aperture on this little splinter of a galaxy.

NGC 6503 is not large but is fairly bright. It is located in a region of Draco where it does not have to much competition for being viewed (though the planetary nebula, NGC 6543, is nearby).

NGC 6822 is Bernard's Galaxy in Sagittarius. It is very large but has a low surface brightness and is located in the rich star clouds of the Milky Way. It is a little difficult to find but once it is spotted it is not to hard to observe. It is a member of the Local Group of Galaxies.

NGC 6946 is a large, fairly bright, broadside spiral located in the star clouds of the Milky Way on the Cygnus-Cepheus border. The rich star studded field and the open star cluster NGC 6939 which is north preceding from it make this galaxy even more worth a look.

NGC 7331 is a large, bright, tilted spiral. It is surrounded by many smaller galaxies and nearby is the famous Stephan's Quintet (NGCs 7317, 7318A, 7318B, 7319 and 7320). NGC 7331 looks very much like a miniature Messier 31.

NGC 7793 is fairly large and bright. It is located in Sculptor but is often overlooked because this area of the sky has several better known showpieces to observe. This galaxy is well worth a look though when you're in the area.

by Gerry Rattley

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SAN JOSE, CA
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