ANTELOPE VALLEY ASTRONOMY CLUB, INC.

Desert Sky Observer

Volume 32 *Antelope Valley Astronomy Club Newsletter* **April 2012**

Up-Coming Events

April 13: Club Meeting*
April 14: Star Party and Lunar Club @ Lee's Church Site/Lee's Flats
April 20: Lockheed Martin Space Day
April 21-22: Poppy Festival @ Lancaster City Park
April 25: Acton Library Star Party @ The Acton Library
April 27: Lunar Club @ Lee's Church Site/Lee's Flats

* Monthly meetings are held at the S.A.G.E. Planetarium on the Cactus School campus in Palmdale, the second Friday of each month. The meeting location is at the northeast corner of Avenue R and 20th Street East. Meetings start at 7 p.m. and are open to the public. *Please note that food and drink are not allowed in the planetarium*

President

Don Bryden

Well after a short delay getting into the groups campsite at Saddleback we settled in for a nice evening. The skies had threatened all day but by sundown the clouds were gone and the winds died. Pam cooked up the burgers and dogs and Rose added baked beans for a nice pre-marathon feast.

Some of the other campers stopped by occasionally for a peek through the scopes but mostly it was down to business with everyone hunting Messier Objects. Kris Chase took top prize with 90 objects - a great job for her first marathon. Also she was the only other person to make it 'till dawn along with me. New member Guy Blackwell took advantage of his family membership by using a team of three to find and bag 51 objects. This was not only their first marathon but nearly their first time with a dobsonian telescope and star-hopping. He would have added about ten or more to that total but he went into the RV to "warm up" at about 4:30am and that was all she wrote!

Ellen and Rose also did quite well but shortly after midnight succumbed to the cold – we needed that bacon Matt! Frank and Bob took their "cats" and the path less taken, eschewing Messier's list for one of their own while Jim and Pam and Bill did the same.

Yours truly bettered my number from last year with 104, just missing two in the evening and four at dawn (the horizons were just too hazy!). Duane put the MarvScope through its paces and was in bed by midnight. Of course his favorite targets, in Sagittarius, wouldn't be up 'till 3am. Surprisingly, he kept his word and was up and at 'em as the teapot cleared the butte!

Our next big star party is scheduled for Saturday, the 14th of April out at Lee's Flats (60th West and Rosamond Blvd.). It's actually a Lunar Club event and we'll be getting up early Sunday to look at the waning moon but you can also come out Saturday evening and take advantage of the nice dark skies.

Hope to see you out there,

-Don

Vice President

Doug Drake

Here we are in the month of April and Jeremy will give us a show on the planetarium dome. Friday the 13th, this month, Jeremy will present the Venus crossing of the Sun, a transit! This apparition shall occur this June 6th and we will be able to observe this event through our own telescopes! It is very important that you have a "Sun filter" on the objective end of your telescope if you decide to view this exciting event. We will talk about how to observe the "Venus transit of the Sun" at our Friday 13th meeting. The club has purchased this special "Dome Show" for the planetarium because of the significant transit event that will not occur again until 105 years from now!

Venus is the third brightest celestial object in the sky at this time of the year. This planet swings in closer to Earth and thus becomes apparently larger and larger. Be sure to observe Venus just after Sun set.

Director of Community Development

Rose Moore

Well, it doesn't look like the warm weather is here yet, but we do have some events coming up! So dress warm, and as always, weather permitting!

The next event is our overnight Lunar Club for April 14th Saturday, at Lee's Flat/Church site in Rosamond. Set up time is before dark of course, and we can get some dark sky observing in as the moon won't be up until 3am for those late-nighters!

April 20th, Friday, is Lockheed Martin Space Day down in Riverside. We need 2 members to attend with Tom Koonce. Arrangements have been made at the Mission Inn for Thursday night April 19th, and the members are invited to a group dinner that evening. Members will need to show a meteor collection, demonstrate a Night Sky Network Kit or other astronomy item of interest and speak to the public. Contact Don for information and/or if you can attend and help out.

Saturday and Sunday, April 21st and 22nd, we have the Poppy Festival at Lancaster City Park. This is a big outreach event for us, and we need volunteers to come out to man the booth, speak to the public, give handouts, or bring a telescope. If you can attend and help out, even for just a couple of hours, please contact me by email, or at the next meeting. We will be setting up at approximately 7am on Saturday.

The Acton Library Astronomy Series with Jeremy continues on Wednesday April 25th! This event is a Star Party, and if you can bring a scope for viewing and help out Jeremy, please come on out and do some outreach! Set up will be before sunset, so if you are able to attend, please check with Jeremy as to what time to be there. Sunset is at 7:47pm.

Other events coming up: Prime Desert Woodlands on Saturday May 12th at 8:00pm; the Annular Eclipse on Sunday May 20th at 2pm at the SAGE Planetarium; RTMC Memorial Day Weekend at Camp Oakes, Big Bear City; the Leona Valley Science Fair on Wednesday May 23rd at 6pm (observing); Transit of Venus on Tuesday June 5th at 3pm at the SAGE; our summer Star-B-Que and Mt. Wilson (September).

More Stargazing Below the Equator by Paul Derrick

Clouds like these over New Zealand's Southern Alps mountains suggest why the Maori called the land Aotearoa, the "land of the long white cloud." (photo by author)

This column, like the previous two, comes to you from the small but fascinating country of New Zealand situated deep in the Southern Hemisphere nearly a thousand miles southeast of Australia. The natural beauty, rich diversity of scenery, and many other factors (like friendly people and no snakes or poison ivy) make this land a virtual paradise.

And for stargazers, getting to see stars, constellations, and other night sky objects in the Southern Celestial Hemisphere is a thrill. But as reported last time, I've been frustrated by cloudiness and have to keep reminding myself that the Maori – the Polynesians who first settled the islands nearly a thousand years ago – named it Aotearoa, "land of the long white cloud." And it's the rains from the clouds that give so many places in New Zealand a lush tropical rain-forest feel. Still, I'd sure like more clear nights.

One clear evening I did get to set up my wife's spotting scope (which she uses for birds) in the parking lot of a back packer (hostel) in which we were staying. Before long a small group assembled and we had a spontaneous mini-star party with folks from Canada, England, Holland and the U.S. When I pointed out Venus and Jupiter, the young man from Holland expressed surprise that the planets could also be seen from "down" here.

Venus (lower left) and Jupiter setting at dusk over the Coromandel Peninsula on the eastern coast of New Zealand's North Island (photo by author)

It gave me an opportunity to explain about the Sun's path across the sky (called the ecliptic), and how the Moon and planets also follow the same path as they move through the sky. And just as the Sun can be seen from all places on Earth, so can the Moon and planets. Owing to the Earth's west-to-east rotation on its axis, the Sun, Moon and planets all rise in the east and set in the west above and below the Equator.

Still, there are differences. From the Northern Hemisphere, the ecliptic tilts toward the south whereas in the Southern Hemisphere it tilts toward the north, and that can be disorienting. When we in the north see the Sun move across our sky each day, we're facing in a southerly direction, and the Sun moves left-to-right across our sky. And it's the same with the Moon and planets at night.

However from the Southern Hemisphere and facing in a northerly direction, they move right-to-left – backward from what we're used to. Even during the day this is confusing: we're accustomed to seeing the morning Sun to our left and the afternoon Sun to our right, and can almost unconsciously estimate the approximate time of day with a quick glace at the Sun's location. But here, we northerners have to consciously remember to reverse things in our mind and realize that the morning Sun will be to our right and the afternoon Sun to our left.

There is also another difference. As mentioned previously, most constellations can be seen from both the Northern and Southern Hemisphere, yet when seen from south of the Equator, they appear upside-down to us northerners. And it's the same with the Sun, Moon, and planets – they too appear upside-down. While that's not noticeable with the Sun and planets (viewed naked-eye), the full Moon's "man in the Moon" is hard to make out as he too is upside-down.

And there are yet a couple of other notable departures from what we're used to seeing. In the Northern Hemisphere, circumpolar stars and constellations rotate around the North Star (Polaris) in a counterclockwise direction whereas in the Southern Hemisphere they rotate clockwise – and they rotate around an essentially empty space in the night sky.

By chance, we have a reasonably bright star – a star we have named Polaris (the North Star) – almost straight up from Earth's North Pole. But in the Southern Hemisphere they're not so lucky as there is no bright star straight above the South Pole, and hence no South Star.

On another note, I had an interesting experience while walking in a small town. A passing stranger looked at my t-shirt, smiled big, and gave me a thumbs-up. At first I was puzzled, but quickly realized I was wearing my "Bring back Pluto" t-shirt. I guess Pluto-lovers are found around the world.

A final issue not related to stargazing is worth mentioning. After our 2001 trip to New Zealand, I was asked if I noticed water draining down basins and toilets in a reverse direction. In fact, that popular notion is a myth. A phenomenon called the Coriolis effect, caused by the rotation of the Earth, does affect large-scale systems like hurricanes which rotate counterclockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere.

But the effect is far too weak to influence the rotational flow of things in our every-day life, like water down drains, except under highly controlled laboratory situations. Other factors – like the direction from which the water enters a toilet or basin or other subtle currents within the water – determine the direction of rotation. If you make it a point to notice such things, you'll find clockwise and counterclockwise motions occur with about equal frequency.

Space Place

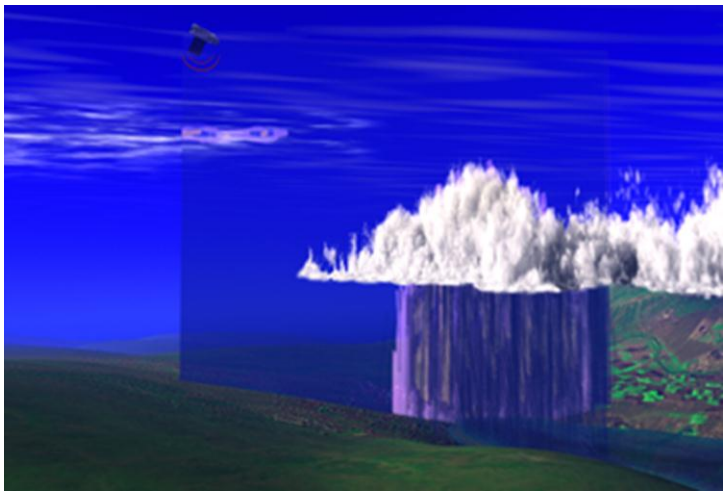
The Planet in the Machine

By Diane K. Fisher and Tony Phillips

The story goes that a butterfly flapping its wings in Brazil can, over time, cause a tornado in Kansas. The "butterfly effect" is a common term to evoke the complexity of interdependent variables affecting weather around the globe. It alludes to the notion that small changes in initial conditions can cause wildly varying outcomes.

Now imagine millions of butterflies flapping their wings. And flies and crickets and birds. Now you understand why weather is so complex.

All kidding aside, insects are not in control. The real "butterfly effect" is driven by, for example, global winds and ocean currents, polar ice (melting and freezing), clouds and rain, and blowing desert dust. All these things interact with one another in bewilderingly complicated ways.



CloudSat is one of the Earth-observing satellites collecting data that will help develop and refine atmospheric circulation models and other types of weather and climate models. CloudSat's unique radar system reads the vertical structure of clouds, including liquid water and ice content, and how clouds affect the distribution of the Sun's energy in the atmosphere. See animation of this data simulation at: www.nasa.gov/mission_pages/calipso/multimedia/cloud_calip_mm.html.

And then there's the human race. If a butterfly can cause a tornado, what can humans cause with their boundlessly reckless disturbances of initial conditions?

Understanding how it all fits together is a relatively new field called Earth system science. Earth system scientists work on building and fine-tuning mathematical models (computer programs) that describe the complex inter-relationships of Earth's carbon, water, energy, and trace gases as they are exchanged between the terrestrial biosphere and the atmosphere. Ultimately, they hope to understand Earth as an integrated system, and model changes in climate over the next 50-100 years. The better the models, the more accurate and detailed will be the image in the crystal ball.

NASA's Earth System Science program provides real-world data for these models via a swarm of Earth-observing satellites. The satellites, which go by names like Terra and Aqua, keep an eye on Earth's land, biosphere, atmosphere, clouds, ice, and oceans. The data they collect are crucial to the modeling efforts.

Some models aim to predict short-term effects—in other words, weather. They may become part of severe weather warning systems and actually save lives. Other models aim to predict long-term effects—or climate. But, long-term predictions are much more difficult and much less likely to be believed by the general population, since only time can actually prove or disprove their validity. After all, small errors become large errors as the model is left to run into the future. However, as the models are further validated with near- and longer-term data, and as different models converge on a common scenario, they become more and more trustworthy to show us the future while we can still do something about it—we hope.

For a listing and more information on each of NASA's (and their partners') Earth data-gathering missions, visit http://science.nasa.gov/earth-science/missions/. Kids can get an easy introduction to Earth system science and play Earthy word games at http://spaceplace.nasa.gov/ecosphere.

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April Sky Data

Best time for deep sky observing this month:
April 11 through April 22

Mercury is at its greatest distance west of the Sun on April 18th, so in theory this elusive little planet should be visible before sunrise. However, it rises less than half an hour before the Sun, so we won't be able to see it this month.

Venus continues its spectacular performance as a brilliant "Evening Star" this month. It's high in the western sky immediately after sunset, and doesn't set until well after midnight. Venus is moving rapidly eastwards across Taurus; it passes through the edge of the Pleiades or "Seven Sisters" star-cluster on the evening of April 3rd.

Mars is high in the southern sky at dusk, and doesn't set in the west until dawn. Relative to the stars, the "Red Planet" is almost stationary in the constellation of Leo, just to the left of the bright star Regulus: it moves a little way towards Regulus, and then starts to turn away again, but they are never much more than 5 degrees apart all month.

At the start of April, **Jupiter** is low in the west at dusk, and every night it appears a little lower down, and sets a little earlier; by the end of the month, it's disappearing below the horizon less than an hour after sunset.

Saturn is at opposition (to the Sun) on April 15th, so this month it can be seen all night: it rises as the Sun is setting, reaches its highest point in the south at midnight and sets as the Sun is rising. This is also the point where Saturn is closest to us, so it appears biggest and brightest.

The Lyrid **meteor-shower** is active during the third week of April, peaking probably in the early hours of Sunday April 22nd. The meteors seem to radiate outwards from a point in the constellation of Lyra, close to the bright star Vega, which is high in the south-east after midnight. The best time to look is in the early hours of the morning, before the sky grows bright towards dawn; near the peak, we might expect to see one Lyrid every 5–10 minutes, and there will be no interference from the Moon.

Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
4/1/2012	14:01	03:04	06:37	19:13
4/5/2012	18:26	05:30	06:32	19:16
4/10/2012	------	09:26	06:25	19:20
4/15/2012	03:07	14:35	06:19	19:24
4/20/2012	05:40	19:16	06:13	19:28
4/25/2012	09:03	23:36	06:07	19:32
4/30/2012	13:52	02:13	06:01	19:36

Planet Data

Apr 1

	Rise	Transit	Set	Mag
Mercury	05:41	11:42	17:48	1.8
Venus	08:31	15:50	23:08	-4.4
Mars	15:55	22:38	05:21	-0.7
Jupiter	08:01	14:54	21:44	-2.1
Saturn	20:07	01:52	07:37	0.3

Apr 15

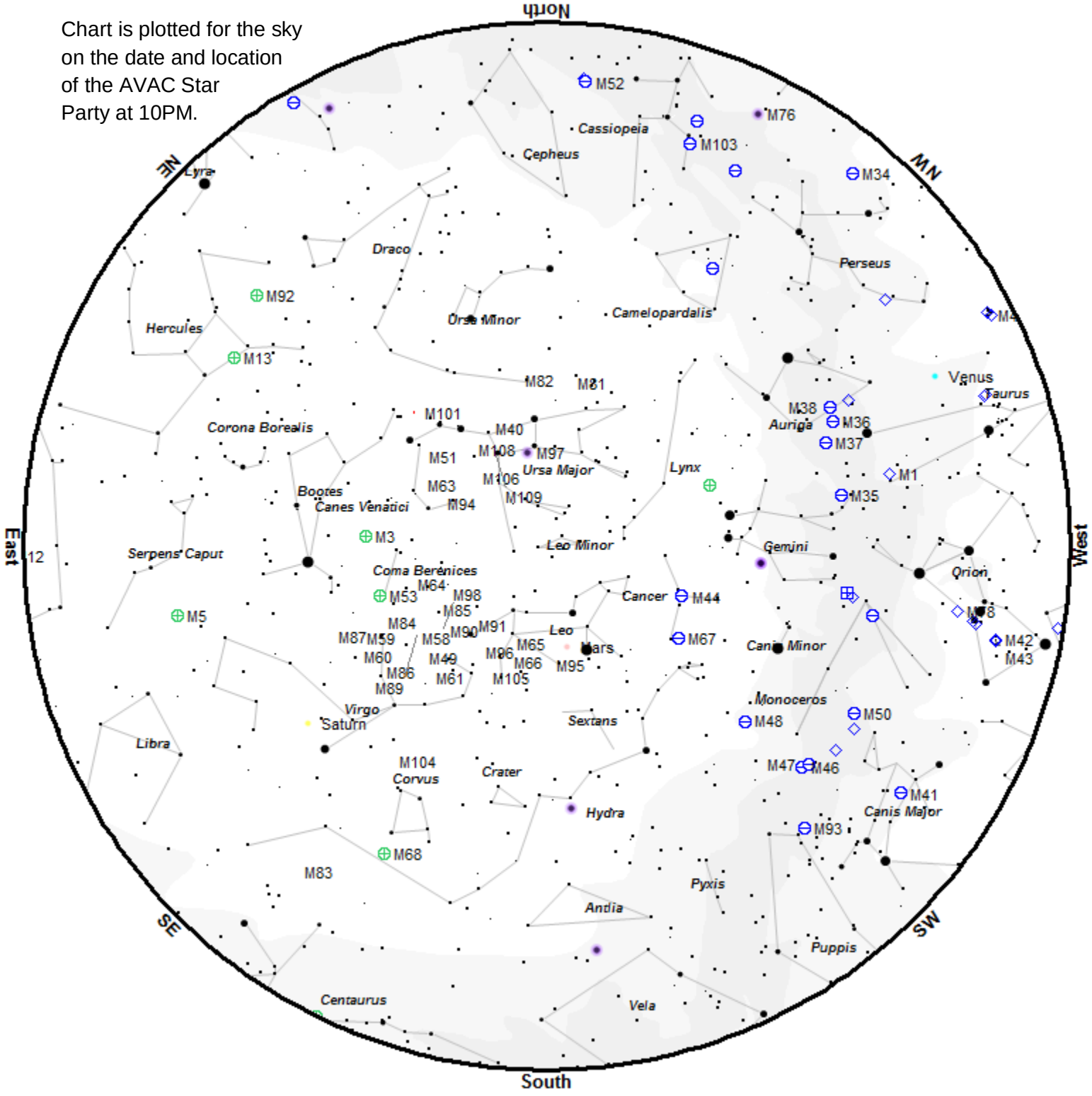
	Rise	Transit	Set	Mag
Mercury	05:11	11:13	17:15	0.5
Venus	08:16	15:46	23:15	-4.5
Mars	14:56	21:39	04:21	-0.4
Jupiter	07:15	14:11	21:05	-2.0
Saturn	19:07	00:53	06:39	0.2

Apr 30

	Rise	Transit	Set	Mag
Mercury	05:02	11:22	17:39	-0.1
Venus	07:54	15:30	23:04	-4.5
Mars	14:06	20:45	03:24	0.0
Jupiter	06:27	13:26	20:23	-2.0
Saturn	18:03	23:50	05:36	0.3

Planet, Sun, and Moon data calculated for local time at Lancaster, CA

Chart is plotted for the sky on the date and location of the AVAC Star Party at 10PM.



To use the chart, go outside within an hour or so of the time listed and hold it up to the sky. Turn the chart so the direction you are looking is at the bottom of the chart. If you are looking to the south then have 'South horizon' at the lower edge.

Suggested Observing List

The list below contains objects that will be visible on the night of the AVAC Star Party. The list is sorted by the best time to observe the object. The difficulty column describes how difficult it is to observe the object from the current location on a perfect night in a 6 inch Newtonian telescope.

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
NGC 2547	Open	5.0	Vel	08h10m09.0s	-49°12'54"	20:15	20:31	21:00	challenging
IC 2391	Open	2.6	Vel	08h40m32.0s	-53°02'00"	20:17	20:31	20:54	challenging
IC 2395	Open	4.6	Vel	08h42m30.0s	-48°06'48"	20:23	20:37	21:03	detectable
NGC 2477	Open	5.7	Pup	07h52m10.0s	-38°31'48"	20:25	20:41	21:17	easy
NGC 2451	Open	3.7	Pup	07h45m23.0s	-37°57'21"	20:25	20:41	21:16	easy
NGC 2439	Open	7.1	Pup	07h40m45.0s	-31°41'36"	20:28	20:44	21:28	detectable
M 41	Open	5.0	CMa	06h46m01.0s	-20°45'24"	20:30	20:44	21:21	easy
NGC 2546	Open	5.2	Pup	08h12m15.0s	-37°35'42"	20:34	20:45	21:00	challenging
M 93	Open	6.5	Pup	07h44m30.0s	-23°51'24"	20:27	20:47	21:59	easy
NGC 2360	Open	9.1	CMa	07h17m43.0s	-15°38'30"	20:28	20:47	20:52	challenging
NGC 2571	Open	7.4	Pup	08h18m56.0s	-29°45'00"	20:28	20:47	21:58	detectable
M 50	Open	7.2	Mon	07h02m42.0s	-08°23'00"	20:30	20:48	21:17	detectable
NGC 2440	PNe	11.5	Pup	07h41m55.4s	-18°12'31"	20:32	20:48	20:58	difficult
NGC 1444	Open	6.4	Per	03h49m25.0s	+52°39'30"	20:27	20:49	22:27	obvious
NGC 1746	Open	6.1	Tau	05h03m50.0s	+23°46'12"	20:37	20:49	20:57	detectable
M 1	Neb	8.4	Tau	05h34m30.0s	+22°01'00"	20:29	20:49	21:24	challenging
NGC 2169	Open	7.0	Ori	06h08m24.0s	+13°57'54"	20:27	20:49	21:37	obvious
NGC 2237	Neb	5.5	Mon	06h32m02.0s	+04°59'10"	20:29	20:49	21:35	challenging
NGC 2353	Open	5.2	Mon	07h14m30.0s	-10°16'00"	20:27	20:49	21:20	easy
NGC 2423	Open	7.0	Pup	07h37m06.0s	-13°52'18"	20:29	20:49	21:22	easy
M 47	Open	4.3	Pup	07h36m35.0s	-14°29'00"	20:26	20:49	21:18	obvious
NGC 2301	Open	6.3	Mon	06h51m45.0s	+00°27'36"	20:28	20:50	21:41	easy
M 46	Open	6.6	Pup	07h41m46.0s	-14°48'36"	20:30	20:49	21:22	detectable
NGC 1528	Open	6.4	Per	04h15m23.0s	+51°12'54"	20:32	20:50	21:08	easy
NGC 1664	Open	7.2	Aur	04h51m06.0s	+43°40'30"	20:30	20:50	21:27	easy
NGC 2129	Open	7.0	Gem	06h01m07.0s	+23°19'20"	20:27	20:50	21:53	obvious
NGC 2175	Open	6.8	Ori	06h09m39.0s	+20°29'12"	20:32	20:50	21:53	detectable
NGC 2264	Open	4.1	Mon	06h40m58.0s	+09°53'42"	20:29	20:51	21:59	easy
M 38	Open	6.8	Aur	05h28m40.0s	+35°50'54"	20:33	20:51	21:48	detectable
M 36	Open	6.5	Aur	05h36m18.0s	+34°08'24"	20:29	20:51	21:52	easy
M 35	Open	5.6	Gem	06h09m00.0s	+24°21'00"	20:29	20:51	22:03	easy
NGC 2506	Open	8.9	Mon	08h00m01.0s	-10°46'12"	20:35	20:51	21:37	challenging
M 37	Open	6.2	Aur	05h52m18.0s	+32°33'12"	20:30	20:51	22:04	easy
NGC 1502	Open	4.1	Cam	04h07m50.0s	+62°19'54"	20:23	20:52	21:27	obvious
NGC 2355	Open	9.7	Gem	07h16m59.0s	+13°45'00"	20:34	20:52	21:51	difficult
NGC 2392	PNe	8.6	Gem	07h29m10.8s	+20°54'42"	20:24	20:53	23:15	obvious
M 44	Open	3.9	Cnc	08h40m24.0s	+19°40'00"	20:28	20:57	00:00	easy
M 67	Open	7.4	Cnc	08h51m18.0s	+11°48'00"	20:34	20:58	23:00	detectable

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
M 81	Gal	7.8	UMa	09h55m33.1s	+69°03'56"	20:32	21:18	02:49	detectable
M 82	Gal	9.0	UMa	09h55m52.4s	+69°40'47"	20:30	21:18	03:04	detectable
NGC 3132	PNe	8.2	Vel	10h07m01.8s	-40°26'11"	20:25	21:24	23:06	easy
NGC 3132	PNe	8.2	Vel	10h07m01.8s	-40°26'11"	20:25	21:24	23:06	easy
NGC 3228	Open	6.4	Vel	10h21m22.0s	-51°43'42"	21:12	21:38	22:03	challenging
NGC 3227	Gal	11.5	Leo	10h23m30.6s	+19°51'54"	20:34	21:41	00:32	difficult
NGC 3242	PNe	8.6	Hya	10h24m46.1s	-18°38'32"	20:22	21:42	23:37	obvious
M 97	PNe	9.7	UMa	11h14m47.7s	+55°01'09"	20:33	22:32	02:44	detectable
M 65	Gal	10.1	Leo	11h18m55.7s	+13°05'32"	20:33	22:35	01:48	detectable
M 66	Gal	9.7	Leo	11h20m14.9s	+12°59'30"	20:32	22:37	01:55	detectable
M 106	Gal	9.1	CVn	12h18m57.6s	+47°18'13"	20:37	23:36	03:09	detectable
Col 256	Open	2.9	Com	12h25m06.0s	+26°06'00"	20:31	23:42	03:22	easy
M 84	Gal	10.1	Vir	12h25m03.9s	+12°53'12"	20:43	23:42	02:50	detectable
M 86	Gal	9.8	Vir	12h26m12.2s	+12°56'44"	20:51	23:43	02:36	detectable
M 49	Gal	9.3	Vir	12h29m46.8s	+08°00'01"	20:44	23:47	02:55	detectable
M 87	Gal	9.6	Vir	12h30m49.2s	+12°23'29"	20:43	23:47	02:59	detectable
NGC 4565	Gal	10.1	Com	12h36m20.8s	+25°59'15"	20:54	23:53	02:54	difficult
M 104	Gal	9.1	Vir	12h39m59.3s	-11°37'22"	21:16	23:57	02:37	detectable
M 68	Glob	7.3	Hya	12h39m28.0s	-26°44'36"	21:59	23:56	01:54	detectable
M 94	Gal	8.7	CVn	12h50m53.1s	+41°07'12"	20:35	00:08	03:39	detectable
M 64	Gal	9.3	Com	12h56m43.8s	+21°41'00"	20:44	00:13	03:09	detectable
NGC 5128	Gal	7.8	Cen	13h25m27.7s	-43°01'07"	23:09	00:42	02:15	challenging
NGC 5139	Glob	3.9	Cen	13h26m46.0s	-47°28'36"	23:32	00:44	01:54	challenging
NGC 5195	Gal	10.5	CVn	13h29m59.6s	+47°15'58"	20:58	00:46	03:26	detectable
M 51	Gal	8.7	CVn	13h29m52.3s	+47°11'40"	20:38	00:46	04:38	easy
M 83	Gal	7.8	Hya	13h37m00.8s	-29°51'56"	22:54	00:53	02:52	detectable
M 3	Glob	6.3	CVn	13h42m11.0s	+28°22'42"	21:01	00:58	04:16	detectable
M 101	Gal	8.4	UMa	14h03m12.4s	+54°20'53"	21:27	01:19	03:46	detectable
NGC 5897	Glob	8.4	Lib	15h17m24.0s	-21°00'36"	01:01	02:33	03:08	challenging
M 5	Glob	5.7	Ser	15h18m34.0s	+02°05'00"	23:17	02:35	05:04	easy
NGC 5986	Glob	7.6	Lup	15h46m03.0s	-37°47'12"	01:50	03:02	03:16	difficult
M 13	Glob	5.8	Her	16h41m41.0s	+36°27'36"	23:32	03:07	05:12	easy
M 9	Glob	7.8	Oph	17h19m12.0s	-18°31'00"	02:38	03:07	05:08	difficult
M 80	Glob	7.3	Sco	16h17m02.0s	-22°58'30"	02:23	03:07	04:42	detectable
M 19	Glob	6.8	Oph	17h02m38.0s	-26°16'06"	02:12	03:07	05:08	detectable
NGC 6543	PNe	8.3	Dra	17h58m33.4s	+66°37'59"	22:59	03:08	05:22	obvious
M 92	Glob	6.5	Her	17h17m07.0s	+43°08'12"	23:54	03:08	05:12	easy
IC 4665	Open	5.3	Oph	17h46m18.0s	+05°43'00"	01:48	03:08	05:09	detectable
M 12	Glob	6.1	Oph	16h47m14.0s	-01°56'48"	00:44	03:08	05:12	easy
M 14	Glob	7.6	Oph	17h37m36.0s	-03°14'48"	01:48	03:08	05:11	detectable
M 10	Glob	6.6	Oph	16h57m09.0s	-04°06'00"	01:20	03:08	05:09	detectable
M 62	Glob	6.4	Oph	17h01m13.0s	-30°06'48"	02:08	03:08	05:10	detectable
NGC 6124	Open	6.3	Sco	16h25m20.0s	-40°39'12"	01:57	03:08	05:09	challenging
NGC 6167	Open	6.6	Nor	16h34m34.0s	-49°46'18"	03:21	03:52	04:23	challenging
NGC 6178	Open	7.2	Sco	16h35m47.0s	-45°38'36"	02:39	03:55	04:57	detectable

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
NGC 6193	Open	5.4	Ara	16h41m20.0s	-48°45'48"	03:17	03:59	04:39	difficult
NGC 6322	Open	6.5	Sco	17h18m25.0s	-42°56'00"	02:53	04:36	05:18	easy
NGC 6383	Open	5.4	Sco	17h34m48.0s	-32°34'00"	02:31	04:45	05:16	easy
M 6	Open	4.6	Sco	17h40m20.0s	-32°15'12"	02:25	04:46	05:17	easy
NGC 6633	Open	5.6	Oph	18h27m15.0s	+06°30'30"	01:52	04:47	05:16	easy
M 23	Open	5.9	Sgr	17h57m04.0s	-18°59'06"	03:20	04:47	05:13	detectable
M 57	PNe	9.4	Lyr	18h53m35.1s	+33°01'45"	01:13	04:48	05:17	easy
NGC 6572	PNe	8.0	Oph	18h12m06.4s	+06°51'12"	01:35	04:48	05:26	obvious
M 56	Glob	8.4	Lyr	19h16m36.0s	+30°11'06"	02:21	04:49	05:10	detectable
IC 4756	Open	5.4	Ser	18h39m00.0s	+05°27'00"	02:08	04:48	05:12	detectable
NGC 6388	Glob	6.8	Sco	17h36m17.0s	-44°44'06"	04:04	04:48	05:10	challenging
M 16	Open	6.5	Ser	18h18m48.0s	-13°48'24"	03:07	04:49	05:18	obvious
M 17	Open	7.3	Sgr	18h20m47.0s	-16°10'18"	03:39	04:49	05:09	difficult
M 21	Open	7.2	Sgr	18h04m13.0s	-22°29'24"	04:03	04:49	05:12	detectable
M 20	Open	5.2	Sgr	18h02m42.0s	-22°58'18"	04:09	04:49	05:14	easy
M 8	Neb	5.0	Sgr	18h04m02.0s	-24°23'14"	04:35	04:49	05:17	easy
NGC 7160	Open	6.4	Cep	21h53m40.0s	+62°36'12"	03:06	04:50	05:17	obvious
IC 1396	Neb		Cep	21h39m06.0s	+57°30'00"	03:06	04:50	05:13	challenging
NGC 6871	Open	5.8	Cyg	20h05m59.0s	+35°46'36"	02:21	04:50	05:13	easy
M 18	Open	7.5	Sgr	18h19m58.0s	-17°06'06"	03:28	04:50	05:17	easy
NGC 6910	Open	7.3	Cyg	20h23m12.0s	+40°46'42"	02:27	04:50	05:14	easy
M 29	Open	7.5	Cyg	20h23m57.0s	+38°30'30"	02:33	04:50	05:12	easy
M 27	PNe	7.3	Vul	19h59m36.3s	+22°43'16"	02:42	04:51	05:14	easy
M 7	Open	3.3	Sco	17h53m51.0s	-34°47'36"	03:01	04:51	05:16	detectable
M 39	Open	5.3	Cyg	21h31m48.0s	+48°26'00"	03:18	04:51	05:13	easy
M 71	Glob	8.4	Sge	19h53m46.0s	+18°46'42"	02:46	04:51	05:14	easy
M 11	Open	6.1	Sct	18h51m05.0s	-06°16'12"	03:01	04:51	05:12	detectable
M 25	Open	6.2	Sgr	18h31m47.0s	-19°07'00"	03:56	04:51	05:13	detectable
Cocoon	Neb	10.0	Cyg	21h53m24.0s	+47°16'00"	03:43	04:52	05:13	challenging
M 28	Glob	6.9	Sgr	18h24m33.0s	-24°52'12"	03:34	04:51	05:13	detectable
M 52	Open	8.2	Cas	23h24m48.0s	+61°35'36"	04:40	04:52	05:06	detectable
NGC 7243	Open	6.7	Lac	22h15m08.0s	+49°53'54"	04:00	04:52	05:08	detectable
M 22	Glob	5.2	Sgr	18h36m24.0s	-23°54'12"	03:35	04:52	05:12	detectable
NGC 6716	Open	7.5	Sgr	18h54m34.0s	-19°54'06"	04:26	04:53	05:15	detectable
M 15	Glob	6.3	Peg	21h29m58.0s	+12°10'00"	04:38	04:56	05:11	detectable
M 70	Glob	7.8	Sgr	18h43m13.0s	-32°17'30"	04:10	04:56	05:12	difficult
M 54	Glob	7.7	Sgr	18h55m03.0s	-30°28'42"	04:23	04:56	05:10	difficult
NGC 6818	PNe	10.0	Sgr	19h43m57.8s	-14°09'12"	04:33	04:57	05:20	easy
NGC 6541	Glob	6.3	CrA	18h08m02.0s	-43°42'54"	04:29	04:58	05:12	challenging
NGC 6723	Glob	6.8	Sgr	18h59m33.0s	-36°37'54"	04:29	04:59	05:14	difficult
M 55	Glob	6.3	Sgr	19h40m00.0s	-30°57'42"	04:33	05:00	05:12	detectable

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The Club has three categories of membership.

- Family membership at $30.00 per year.
- Individual membership at $25.00 per year.
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